ALBERT J. KEARNEY

UNDERSTANDING APPLIED BEHAVIOR ANALYSIS

AN INTRODUCTION TO ABA FOR PARENTS, TEACHERS, AND OTHER PROFESSIONALS

SECOND EDITION

SHOUT
SHARE
IT

UNDERSTANDING APPLIED BEHAVIOR ANALYSIS

of related interest

The Parent's Guide to In-Home ABA Programs
Frequently Asked Questions about Applied Behavior Analysis for your Child with Autism
Elle Olivia Johnson
ISBN 978 1 84905 918 3
eISBN 978 0 85700 725 4

Teaching Your Child with Love and Skill
A Guide for Parents and Other Educators of Children with Autism, including Moderate to Severe Autism
Joyce Show
ISBN 978 1 84905 876 6
eISBN 978 0 85700 569 4

A Step-by-Step Curriculum for Early Learners with Autism Spectrum Disorders
Lindsay Hilsen
ISBN 978 1 84905 874 2
eISBN 978 0 85700 546 5

Tales from the Table
Lovaas/ABA Intervention with Children on the Autistic Spectrum
Margaret Anderson
ISBN 978 1 84310 306 6
eISBN 978 1 84642 611 7

Video Modelling and Behaviour Analysis
A Guide for Teaching Social Skills to Children with Autism
Christos Nikopoulos and Mickey Keenan
Foreword by Sandy Hobbs
ISBN 978 1 84310 338 7
eISBN 978 1 84642 521 9

Applied Behaviour Analysis and Autism
Building A Future Together
Edited by Mickey Keenan, Mary Henderson, Ken P. Kerr and Karola Dillenburger
ISBN 978 1 84310 310 3
eISBN 978 1 84642 455 7

Parents' Education as Autism Therapists
Applied Behaviour Analysis in Context
Edited by Mickey Keenan, Ken P. Kerr and Karola Dillenburger
ISBN 978 1 85302 778 9
eISBN 978 0 85700 125 2

UNDERSTANDING APPLIED BEHAVIOR ANALYSIS

AN INTRODUCTION TO ABA
FOR PARENTS, TEACHERS,
AND OTHER PROFESSIONALS

SECOND EDITION

ALBERT J. KEARNEY

Jessica Kingsley *Publishers*
London and Philadelphia

First edition published by Jessica Kingsley Publishers in 2007
Second edition published in 2015
by Jessica Kingsley Publishers
73 Collier Street
London N1 9BE, UK
and
400 Market Street, Suite 400
Philadelphia, PA 19106, USA

www.jkp.com

Copyright © Albert J. Kearney 2015

Front cover image source: Shutterstock®. The cover image is for illustrative purposes only, and any person featuring is a model.

All rights reserved. No part of this publication may be reproduced in any material form (including photocopying or storing it in any medium by electronic means and whether or not transiently or incidentally to some other use of this publication) without the written permission of the copyright owner except in accordance with the provisions of the Copyright, Designs and Patents Act 1988 or under the terms of a licence issued by the Copyright Licensing Agency Ltd, Saffron House, 6–10 Kirby Street, London EC1N 8TS. Applications for the copyright owner's written permission to reproduce any part of this publication should be addressed to the publisher.

Warning: The doing of an unauthorized act in relation to a copyright work may result in both a civil claim for damages and criminal prosecution.

Library of Congress Cataloging in Publication Data
Kearney, Albert J.
Understanding applied behavior analysis : an introduction to ABA for parents, teachers, and other professionals / Albert J. Kearney. -- Second edition.
pages cm
Includes bibliographical references and index.
ISBN 978-1-84905-785-1 (alk. paper)
1. Behavior modification. 2. Reinforcement (Psychology) 3. Psychology, Applied. I. Title.
BF637.B4K45 2015
150.19'43--dc23
2014049756

British Library Cataloguing in Publication Data
A CIP catalogue record for this book is available from the British Library

ISBN 978 1 84905 785 1
eISBN 978 1 78450 030 6

To Joe Cautela (1927–1999), my teacher, mentor, and friend, for helping me to understand ABA, a long time ago. And to Mary Grace Baron Moran (1945–2015), my classmate, colleague, and friend, a positively reinforcing person if there ever was one.

ACKNOWLEDGMENTS

One of the problems with writing acknowledgments is the fear of leaving someone out. Right now I feel as if I could double the size of this whole book if I mentioned the names of everyone who has helped me learn about applied behavior analysis (ABA), assisted in the production of this book, or contributed in some other major way to this work.

There are, however, certain people whom I absolutely, positively must thank. I should begin by thanking the three people who taught me about ABA back in my student days, Joe Cautela, Al Jurgela and Bruce Baker, and the person who gave me my first opportunity to apply behavior analysis professionally, Mike Fabien, the first Director of Pupil Services for the Maynard Public Schools.

During the writing of this book several old friends and relatives who have various professional involvements with ABA have read various "editions" of the manuscript and made countless helpful suggestions as it evolved. These include Liz Crowley, Shelley Green, Brian Jadro, BCBA, Meghan Martineau, Ph.D, BCBA-D, Chinye Nolisa, BCBA, Judy Robinson, John Sforza, and Jeanne Xantus. Thanks also to my new friends at Jessica Kingsley Publishers, Steve Jones, Melanie Wilson, Lucy Mitchell, Sarah Minty, and Danielle McLean, for all their help and patience.

And since help can come in many forms, I would of course be remiss if I didn't also thank my good friends in the Maynard Public Schools for all those paperweights. With my organizational skills deficits, I never would have been able to keep track of all those loose pages and papers, and this book would never have come together without them.

Last but certainly not least, special thanks to the other Dr. Kearney, my wife, Anne, of the South Shore Mental Health Center and Action Therapies, who has been with me through just about all of this and has contributed greatly at every step of the way.

CONTENTS

INTRODUCTION 9

QUICK REFERENCE A–Z 13

PART 1 THE ABCs OF ABA

CHAPTER 1 What Does ABA Mean? 20

CHAPTER 2 What is Behavior? 27

CHAPTER 3 What are Antecedents? 37

CHAPTER 4 What are Consequences? 46

CHAPTER 5 What are Some Other Kinds of Learning? 71

PART 2 PUTTING IT ALL TOGETHER

CHAPTER 6 What is a Behavior Analysis? 78

CHAPTER 7 What Do We Do Next? 98

CHAPTER 8 What is Behavioral Education? 131

CHAPTER 9 Summing Up 148

Appendix: What Else Can I Read About ABA? 152

References 156

Subject Index 159

Author Index 165

INTRODUCTION

There are countless scholarly texts and precise scientific volumes that have been written about applied behavior analysis (ABA). This is not one of them. *Understanding Applied Behavior Analysis* is written especially to help introduce ABA to parents of children involved in ABA-based programs, teachers and administrators whose classrooms and schools are serving an increasing number of students receiving ABA-based interventions, paraprofessionals working directly on the front lines with these children, and anyone else working under the guidance of ABA specialists. *Understanding Applied Behavior Analysis* is intended to accomplish this by providing a brief introduction to basic terminology, underlying principles, and commonly used ABA treatment procedures.

Although this is meant to be a general ABA book, you will surely notice that quite a few of the examples given involve children with autism spectrum disorders (ASDs). This is because many people who are new to ABA are first drawn to ABA after a child they are very close to has been diagnosed with an ASD. Much of the publicity and interest in ABA these days is because of ABA's effectiveness with ASDs, so that is where our emphasis will be. But ABA is by no means limited to ASDs. Special education applications of ABA are just one tip of the ABA iceberg. As you read on I encourage you to try to think of even more applications in your daily life.

Probably the first term that many readers find themselves mystified by is the term *applied behavior analysis* itself. While you'll certainly get a more thorough understanding of ABA as you read through this book, just to help you get started you should know that ABA is an approach to changing behaviors that uses procedures based on scientifically established principles of learning. In ABA the behaviors targeted for change are behaviors that are usually socially important to someone in some way. As a scientific approach to behavior change, ABA involves a considerable amount of monitoring

of the intervention programs, collecting data about the behaviors that we hope to change, and ongoing evaluation of the effectiveness of the intervention procedures.

Most fields of science have developed extensive and often confusing vocabularies of their own over the years and ABA is no exception. ABA language can be particularly intimidating to people new to ABA. Educators have often complained about the intimidating terminology used by some of the experts who have provided ABA training programs for them. A main goal of this book is to demystify the esoteric jargon commonly used in the ABA world. I hope to give readers a running start by providing an understanding of what the experts are talking and writing about before they get confused, frustrated and turned off by it all, which has too often been the case in the past.

Understanding Applied Behavior Analysis presents the basics, or the ABCs, of ABA. While ABA is the abbreviation for applied behavior analysis, as far as this book is concerned the letters ABC have a double meaning. The use of ABCs is of course intended to let readers know that this is an ABA primer, written for those who have little or no background in ABA. But as the more ABA-savvy reader will know, ABC also stands for the three building blocks upon which ABA is based, the building blocks that B. F. Skinner referred to as the contingencies of reinforcement—the antecedents, behaviors, and consequences. This book provides a solid introduction to these and other behavior analytic terms and concepts.

Besides being an introduction to ABA, *Understanding Applied Behavior Analysis* is also a user-friendly translation of professional jargon into plain English, sort of like an ABA to plain English dictionary. Rather than providing formal definitions of terms, I try to provide explanations of ABA terms and concepts in everyday common-sense language. So you should acquire a pretty good understanding of basic ABA vocabulary along the way. Not all the terms included are strictly ABA terms, but they do have an ABA flavor to them and often turn up in places where ABA is, or should be, used.

I'll take you through all this as painlessly as I can. I've attempted to include occasional humor to help reduce the anxiety that some readers may experience when first exposed to behavior analytic

language and literature. Although the writing style is intentionally light, the content is as accurate as you'll find in those graduate-level textbooks. While reading this book alone won't make you an expert practitioner of ABA, I hope it will make you an informed consumer or knowledgeable observer, sort of like being a knowledgeable baseball fan.

In Part 1, "The ABCs of ABA," I'll explain what ABA is in more detail and talk about those basic principles or building blocks of ABA—antecedents, behaviors, and consequences. Building on this beginning, the various learning operations and reinforcement schedules of operant conditioning will then be presented. Other kinds of learning will also be briefly introduced. In Part 2, "Putting It All Together," we'll talk more about practical applications of these basic principles as we discuss how the science of behavior analysis can be applied to real-life, everyday behavior problems. A systematic approach to behavioral assessment will be presented and many of the more common behavioral intervention techniques that have been employed with children will be described. Behavior analysts can be very creative and new applications seem to be appearing all the time. Although the presentation of ABA techniques can of course not be complete, we'll certainly present the key techniques you are likely to encounter.

This is supposed to be a "What the heck are they talking about?" book, not a "How the heck do they do that?" book, so readers looking for a detailed "How to" guide should look elsewhere. There are already plenty of excellent "How to do it" books out there, including some I'll mention in the Appendix. As space permits, however, I will try to sneak in a few suggestions here and there.

I've tried to use numerous examples to illustrate many of the concepts presented. But examples can get boring, especially when certain words like *they*, *the student*, *the child*, and so forth just repeat themselves over and over again. So I chose a couple of fictional friends, whom some readers may remember, to play the parts of the children (and occasionally adults) in the examples used to help bring various points to life.

Understanding Applied Behavior Analysis can be used in a variety of ways. It is designed to be read cover to cover as well as being usable as a non-alphabetical glossary. The terms and concepts included

build on each other throughout the text to provide a more complete understanding than one might acquire by simply looking up words here and there. Rather than presenting terms in alphabetical order, they are introduced in logical order so that by becoming familiar with certain basic terms first it should be easier to understand some of the other terms when you run into them later in the book. The quick reference A–Z, along with the table of contents, is placed at the front of the book.

After reading through the book, just stick it on a nearby bookshelf to keep it handy as a quick and easy reference book or as a companion to more specialized texts. As one reader suggested, you can think of your *Understanding Applied Behavior Analysis* as your Swiss army knife of ABA books!

This book has been many years in the making and countless people have contributed to its development over the years. If you have any comments or suggestions for future editions, or perhaps have a good real-life example of any of the concepts presented, by all means send them on in to me, care of Jessica Kingsley Publishers.

So now if there are any terms that you were wondering about you can just turn to the quick reference A–Z that begins on the next page to see where to find those terms. Or you can turn to Chapter 1 and start at the beginning. Either way. The explanations you'll find are a good first step in understanding ABA, sort of like a step in the shaping process. What's that you say? You don't know what shaping is? Well, I could come right out and tell you, but you're much more likely to remember if you look it up yourself. So now read on, or if you're one of those people who like to read the end of mysteries first, you can just turn to page 98 to find *shaping*.

QUICK REFERENCE A–Z

ABA (applied behavior analysis) 20
ABLLS (Assessment of Basic Language and Learning Skills) 140
Abolishing operation (AO) 41
Accidental/incidental reinforcement 69
ADOS (Autism Diagnostic Observation Schedule) 140
Antecedents 37
Attention 110
Automatic reinforcement 49
Avoidance 57
Backup reinforcer. 51
Backward chaining (reverse chaining) 104
Baseline 84
BCBA (board-certified behavior analyst) 23
Behavior 27
Behavior analyst 23
Behavior modification 33
Behavior therapist 23
Behavior therapy 23
Behavioral contract (contingency contract) 119
Behavioral contrast 61
Behavioral drift 101
Behavioral education 131
Behavioral momentum. 103
Behavioral objective 83
Behavioral rehearsal. 127
Behavioral repertoire 72
Behaviorologist 26

Behaviorology 26
Bribery. 121
CABAS (Comprehensive Application of Behavior Analysis to Schooling) 146
Chaining 104
Charting 135
Classical conditioning 73
Clinical behavior analysis (CBA) 24
Cognitive behavior therapist 24
Cognitive behavior therapy (CBT) 24
Collateral behavior 36
Conditioned reinforcer (secondary reinforcer). 48
Consequences 46
Contingency contract (behavioral contract). 119
Contingency of reinforcement. 21
Continuous reinforcement 65
Contrived reinforcement 51
Correction 123
Covert behavior. 35
Covert conditioning. 75
Dead Man Rule 28
Demand fading 123
Differential reinforcement 113
Direct instruction. 131
Discrete trial training. 143
Discriminative stimulus 38
DISTAR (Direct Instruction for the Teaching of Arithmetic and Reading) 132
Distributed practice 125
DRA (differential reinforcement of alternative behavior). 115
DRH (differential reinforcement of high rates of behavior) 117
DRI (differential reinforcement of incompatible behavior) 115
DRL (differential reinforcement of low rates of behavior). 117

DRO (differential reinforcement of other behavior) 114
Duration 86
Early intensive behavioral intervention (EIBI) 142
Echoic 139
Edibles 51
Elicit 44
Emit 44
Environments 31
Errorless learning 132
Escape 57
Establishing operation (EO) 41
Event sampling 85
Evidence-based practice (EBP) 25
Extinction 58
Extinction burst 58
Extrinsic reinforcers 49
Fading, Prompt fading 106
Fixed interval (FI) 66
Fixed ratio (FR) 65
Fluency 134
Frequency 29
Functional analysis 79
Functional behavioral assessment (FBA) 79
Functional communication training (FCT) 139
General level of reinforcement (GLR) 92
Generalization 108
Generalized reinforcer 50
Guided practice 128
Habituation 53
Incidental teaching 143
Integrity check 94
Intermittent reinforcement (partial reinforcement) 65

Intrinsic reinforcers 49
Joint attention 111
Language for Learning. 132
Latency 87
Learning 30
Limited hold 117
Lovaas 142
Maintenance of behavior 108
Maladaptive behavior 35
Mand 138
Massed practice 125
Match to sample 137
Modeling 71
Motivating operation (MO)/Establishing operation (EO) 41
Motivational Assessment Scale (MAS) 90
Natural environment 31
Natural reinforcer 51
NCR (noncontingent reinforcement) 118
Negative practice 124
Negative reinforcement 54
NET (Natural Environment Training) 144
Operant conditioning 46
Overcorrection. 124
Overlearning 141
Pairing 48
Partial reinforcement (intermittent reinforcement). 65
PBIS (Positive Behavioral Interventions and Supports) 146
PECS (Picture Exchange Communication System) 140
Photo chaining 127
Pivotal Response Treatment (PRT) 145
Positive Behavior Support (PBS) 146
Positive practice 124

Positive reinforcement 47
Precision teaching 133
Precursors 44
Premack Principle 91
Primary reinforcer 48
Probe 94
Programmed instruction 135
Programmed text 136
Progressive muscle relaxation (PMR) 129
Prompt 39
Prompt dependent 107
Prompt hierarchy 107
Prosthetic environment 32
PSI (personalized system of instruction) 135
Punishment 60
Radical behavior therapy 24
Radical behaviorism 29
Rate 29
Reinforcement area 120
Reinforcement menu 120
Reinforcement sampling 92
Reinforcement schedules 64
Relaxation training 129
Relevance-of-behavior rule 83
Replacement behavior 82
Response 34
Response class, Class of behavior 30
Response cost 63, 121
Response differentiation 100
Reverse chaining (backward chaining) 104
Rule-governed behavior 74
SAFMEDS 135
Satiation 52

Scatter plot. 88
Scripting 128
Secondary reinforcer (conditioned reinforcer) 48
Setting event 40
Shaping 98
Social reinforcement 50
Social skills training. 125
Social Stories™ 127
Spiral learning 141
Spontaneous recovery 60
Standard behavior chart (standard celeration chart). 134
Standard celeration chart (standard behavior chart). 134
Stimulus 37
Stimulus control. 40
Stimulus equivalence 137
Stimulus overselectivity 111
Superstitious behavior 69
Tact 139
Target behaviors 34
Therapeutic environment 33
Thinning 67
Time out 122
Time sampling 86
Token economy 119
Transfer training 128
Trial 34
Variable interval (VI) 66
Variable ratio (VR) 66
VB-MAPP (Verbal Behavior Milestones Assessment/Placement Program). 141
Verbal behavior 35
Verbal behavior approach 146
Video modeling 127

PART 1

THE ABCs OF ABA

CHAPTER 1

WHAT DOES ABA MEAN?

All of a sudden in the last few years we seem to be hearing the term ABA whenever anyone talks about children with autistic spectrum disorders (ASDs). Especially if we are parents, teachers, or have another role in schools these days, we are often given the impression that ABA is the only thing that's going to save these children, and we'd better do it, and do it right now, or else we are in big trouble. Sounds pretty intimidating, doesn't it?

You may be wondering, what the heck is ABA anyway? Where did it come from? And how am I supposed to "do" ABA when I know next to nothing about this stuff ? Where can I get some answers?

Well, you've come to the right place, at least to get a good start. We're going to go over the ABCs of ABA so you'll have a better idea about what behavioral psychologists, behaviorologists, special educators and behavior analysts are doing to your children and students, and you'll be better able to help when these kids are at home or integrated into your classroom. But first, a brief background check on ABA, because you may already know more about ABA than you think you do.

ABA, APPLIED BEHAVIOR ANALYSIS

ABA is the abbreviation for *applied behavior analysis*.

As I mentioned in the Introduction, ABA is an approach to changing socially useful behaviors that employs scientifically established principles of learning to bring about these changes. At first glance it might appear that ABA is simply the practice of using incentives to reward "good" behavior while ignoring "bad" behavior. Actually, there's more to ABA, a lot more, and you're going to learn a lot more about ABA as you read through this book. From the beginning, though, you should be aware of three important characteristics of ABA that will help explain just what ABA "is."

First, the behaviors we target for change are behaviors that can have real-life applications for the person we are working with. That's the applied part. Second, we are working with real, observable measurable behaviors rather than some abstract diagnosis, and, as we will soon see, the procedures used in ABA are based on scientifically established principles of learning. That's where behavior comes in. The third critical characteristic of ABA is that decisions in ABA are made based on objective data that are collected to help understand what effect, if any, the interventions being used are actually having on the behavior. In many ways ABA is like an ongoing experiment in that we keep close watch over what's happening as a result of our interventions and quickly make adjustments as needed. That's the analysis part.

In using behavioral approaches it is of course very important that we pay close attention to the behaviors that we want to change. But it is also quite important that we pay attention to other factors as well, especially what immediately precedes or happens before the behavior, sometimes called the *Antecedents*, and the events that follow the *Behaviors,* sometimes called the *Consequences.* These three factors—the As, the Bs, and the Cs of behavior and what they have to do with ABA—are the main topics of the first part of this book.

CONTINGENCY OF REINFORCEMENT

The As, Bs, and Cs are so closely related that Skinner used a special term when talking about them, *contingency of reinforcement*, which is a three-part concept: "(1) an occasion upon which behavior occurs, (2) the behavior itself, and (3) the consequences of the behavior" (Skinner 1968, p.4).

Contrary to popular belief, ABA is not new. The Association for Behavior Analysis International, which started out in the United States as the Midwest Association for Behavior Analysis, has been around since 1974. The *Journal of Applied Behavior Analysis* was first published in 1968, so obviously the field of ABA has been around even longer. There is often some debate about who was the first to use this term or that term. While there is a lot of debate over who came up with the term *behavior therapy* I haven't heard much debate about who first used the term *applied behavior analysis.* No one seems

to know for sure anyway. Some think Ullman and Krasner were the first to use ABA in their 1965 book *Case Studies in Behavior Modification*. Others say it is likely that ABA was first used by Montrose Wolf, one of the founders and the first editor of the *Journal of Applied Behavior Analysis* (usually just called JABA). Wolf may be best known for his use of ABA principles in remedial education programs for children known as The Juniper Gardens Children's Project, located in Kansas City, Kansas.

ABA is based on the work of the great American psychologist B. F. Skinner. Many of Skinner's scientific contributions had to do with studying behavior and the process of learning in psychology laboratories. Skinner and his students often studied the behavior of animals such as rats and pigeons and analyzed their behavior under closely monitored conditions. Skinner's work, which is sometimes referred to as *behavior analysis* or the *experimental analysis of behavior*, has also been applied successfully to humans in numerous ways. ABA takes the findings of Skinner and his followers and applies these findings to human beings in a variety of settings such as schools, hospitals, work places, casinos, sports, and homes. The Association for Behavior Analysis International now has more than 35 special interest groups for its members, representing such varied areas of interest and application of ABA principles as autism, behavioral gerontology, behaviorists for social action, organizational behavior management, and clinical behavior analysis. While we'll get into greater detail later, the ABA approach combines interventions usually based on a particular kind of learning commonly associated with Skinner (i.e. operant conditioning) with methods for ongoing objective monitoring of whether or not a particular intervention (or treatment) is working.

WHAT'S IN A NAME?

People working in ABA use a lot of different titles to describe themselves. Here are a few of the more common titles, in case you were wondering who these guys are anyway.

BEHAVIOR ANALYST

A *behavior analyst* is someone who does applied behavior analysis and who, it is hoped, is properly trained to do it well. Although way back in the twentieth century behavior analysts were mostly psychologists or educators who had specialized training and experience in ABA, in recent years there are increasing numbers of undergraduate and graduate programs specifically in ABA. So these days someone called a behavior analyst may or may not have significant training in other areas of psychology or another related field as well.

BCBA

A *BCBA* is a *board-certified behavior analyst*. That is, a behavior analyst who has met considerable educational requirements and passed a test to demonstrate their knowledge of ABA. Again, while the training of BCBAs may be limited to ABA, they may also be trained as psychologists or special educators, or be professionals in other disciplines.

In addition to BCBA, there are three other credentials currently offered by the Behavior Analyst Certification Board (BACB), the organization that certifies behavior analysts. BCBA-D indicates that the BCBA has achieved doctoral level credentials as a board-certified behavior analyst. BCaBA stands for Board Certified assistant Behavior Analyst while an RBT is a Registered Behavior Technician. BCaBAs and RBTs provide various types of assistance to the BCBAs who supervise them. BCaBAs can help gather useful information and develop some behavior plans. RBTs are trained to be the paraprofessionals on the front lines working directly with the people receiving ABA services, usually at home or in a classroom.

BEHAVIOR THERAPY, BEHAVIOR THERAPIST

A *behavior therapist* is someone who does behavior therapy, and, like a behavior analyst, should be trained to do it well. *Behavior therapy* is generally thought of as an approach to psychotherapy that relies on the use of therapeutic techniques based on principles of learning, primarily operant and classical conditioning. Behavior therapy typically involves therapy sessions with a behavior therapist, often a specially trained psychologist, but sometimes psychiatrists, social

workers, nurses, counselors, or others. Much of the treatment in behavior therapy involves guided talking with cooperative clients, who may be children or adults, about their problems and the directed use of behavior therapy techniques, many of which are ABA based.

Perhaps the best-known behavior therapy technique is systematic desensitization, originally developed by Joseph Wolpe (1958) and demonstrated to be particularly effective in treating phobias.

RADICAL BEHAVIOR THERAPY, RADICAL BEHAVIOR THERAPIST

There are a number of treatment procedures used in traditional behavior therapy that are consistent with radical behaviorism and sometimes referred to as *radical behavior therapy*. Examples of these procedures, which often involve guided imagery, include systematic desensitization and covert conditioning.

COGNITIVE BEHAVIOR THERAPY (CBT), COGNITIVE BEHAVIOR THERAPIST

Cognitive behavior therapy (*CBT*) refers to any of a number of types of psychotherapy that emphasize trying to help clients deal better with their problems by helping them to change the ways they think or talk to themselves about things. There are many different approaches to cognitive behavior therapy that vary in how much they rely on principles of learning. One problem area that cognitive behavior therapy seems to be particularly helpful for is in treating depression. While cognitive behavior therapy isn't generally considered to be part of ABA, many cognitive behavior therapists use ABA principles in their work.

CLINICAL BEHAVIOR ANALYSIS (CBA), CLINICAL BEHAVIOR ANALYST

Clinical behavior analysis (*CBA*) is another term that refers to let's-sit-down-and-talk-about-it approaches to dealing with problem behaviors. There are several different therapies that are considered to fall under the CBA heading. Two of the better-known CBA treatments that you may have already heard of are *Acceptance and Commitment Therapy* (*ACT*) and *Dialectical Behavior Therapy* (*DBT*).

An important point that these approaches have in common is that they are evidence-based approaches whose proponents understand that diagnostic labels are largely inferred from problem behaviors that can be thought of as target behaviors. It is the problem behaviors, not the diagnostic labels, that are treated.

EVIDENCE-BASED PRACTICE (EBP)

Evidence-based practice (*EBP*) refers to making decisions based on real evidence rather than wild guesses, wishful thinking, or undocumented claims and promises. Just what we may be willing to accept as evidence can cover quite a wide range. Toward the lower end of this range is what is called *anecdotal evidence*. Anecdotal evidence is essentially support based on interesting stories. "My uncle Joe's poison ivy healed up after he went swimming in the ocean. Therefore I know that salt water is the cure for poison ivy." Well that's pretty weak evidence. We should ask a few questions, including "How many other people with poison ivy have gone swimming in the ocean without their poison ivy improving?" We could also ask how many people's poison ivy got better without going in salt water, but that answer could mislead us because there might be more than one cure. At the other end of the range we can have much more complicated controlled scientific studies that compare the results of various treatments (or no treatment at all) to each other. Would a salt water bath work any better (or worse) than a fresh water bath? Or how about a beer bath? (Warning: don't try this at home, I don't want to be responsible for you wasting perfectly good beer!) So if someone tries to sell you on something ask them what their evidence is.

Why do I bring this up? Psychology and education historically have been notorious for accepting treatment approaches based on theory or convincing marketing alone, with very little supporting evidence. The bright side is things do seem to be moving in the right direction. As far as being evidence based goes, ABA is as evidence based as it gets these days. What's my evidence for this statement you may ask? Go to www.nationalautismcenter.org and check out the National Standards Report.

BEHAVIOROLOGY, BEHAVIOROLOGIST

Although there are some pretty lengthy and complicated definitions of *behaviorology* out there, a simplified description might be something like, behaviorology is the science of contingent relations between behavior and other events." Behaviorology is a newer term than ABA. It first appeared in the 1980s, to describe the emerging scientific approach to the study of behavior that continues to evolve from psychology and other disciplines. Behaviorology is broader than we generally think of ABA as being, is becoming a field of its own, and is likely to become more widely known as time goes on. While many *behaviorologists* belong to the *Association for Behavior Analysis International*, there is another professional organization for behaviorologists called *The International Society for Behaviorology*.

Now that you have a general idea of what ABA is all about, it's time to get an even better understanding of ABA. I'd like to start all this with a section on antecedents, since it seems as if it would be a lot neater to go alphabetically, A, B, C. But it really will help more with a better understanding of A, or antecedents, if we do B, or behavior, first, so here we go…

CHAPTER 2

WHAT IS BEHAVIOR?

BEHAVIOR

Behavior is a word we hear and use quite a bit. Most of us take it for granted that we know what it means when we hear or see the word behavior. According to one definition in Webster's dictionary, behavior is the manner of conducting oneself. That's fine, but isn't that just a fancy way of saying, "The way we act?" Another more formal definition by a behavioral psychologist would be something like: *behavior is any external or internal observable and measurable act of an organism.* That sounds complicated, but when we take this definition apart piece by piece it starts to make more sense. Once again, I'd rather start at the beginning and work through this definition in a nice, orderly, step-by-step fashion, but for some reason it makes more sense to start at the end and work toward the front. How do I keep getting myself into these things?

Psychologists work with lots of different living creatures, humans of course, but also monkeys, pigeons, rats, dolphins, and dogs, among others. So to be inclusive we often use the fancy word *organism.* But as far as we are concerned, for our purposes in this book, we're talking about human beings, people, persons! By an *act* we aren't talking about part of a play or a comedy routine, but an action, something somebody actually *does.* It could be walking, talking, or kicking a soccer ball. It could be writing the letters of the alphabet, making eye contact with a teacher, or singing a song. These acts can clearly be observed (seen, heard, etc.) and measured (e.g. counted) in a variety of ways that we will talk about later. But they really do have to be objective acts, not just a subjective personal opinion or descriptive labels (such as saying someone is aggressive, depressed, anxious, and the like) inferred from seemingly related acts.

Those labels aren't really observable acts, are they? They are all adjectives used to describe objective acts or behaviors. What gets

called an aggressive act might be anything from giving someone a dirty look to shooting them with a gun. So if we just say "aggressive" without specifying the act, we really don't know what the speaker observed or what the culprit really did, and we can easily mislead someone else or be misled ourselves.

DEAD MAN RULE

Some people find it helpful to think of a behavior as being some kind of movement. Thinking of behavior as movement means that sitting still and keeping quiet are not behaviors. There is an old saying I've heard many times by Ogden Lindsley, one of the pioneers of precision teaching, called the *Dead Man Rule*. He said that if a dead man can do it, it's not a behavior. So if you're not sure if something is a behavior or not, just ask yourself whether or not a dead man can do it. Using the Dead Man Rule at least helps narrow down some of the possibilities.

When we say the act can be either external or internal, we're talking about the person's body, that is, the person who performs the act or behavior. External acts are things that occur outside the body that almost anyone around could directly observe and recognize. These external acts are often described as overt or public behaviors. Brushing your teeth, doing a dance, talking on the telephone are overt behaviors. But we also have internal, covert, private behaviors. These internal, covert behaviors include physiological acts of our bodies, such as the beating of our hearts and the digestion going on in our stomachs. Even emitting brainwaves are internal behaviors that are not so easily or directly observed. Usually medical instruments of some kind or other are needed to observe and measure covert physiological behaviors, but just because no one sees the actions of these internal bodily organs directly, this doesn't mean that they are not behaviors.

Other internal, covert or private behaviors are actions or events that we commonly think of not as physiological behaviors but rather as *psychological* behaviors. These include behaviors such as thinking and having images and feelings. Pretty much the only observer of these actions is the person doing or experiencing them, so they can be awfully hard to work with. But when you stop and think about

it, we usually know what we're thinking about ourselves, whether we're just talking to ourselves "quietly inside our heads," or thinking in images or pictures. After all, don't we often tell others what we're thinking and describe what we are imagining when we want to? The same goes for feelings. While sometimes our facial expressions and other external actions give away how we are feeling, we generally know what feelings we are experiencing, even if we choose outwardly to act differently in the hope of hiding our feelings from others. So external acts and internal acts, both physiological and psychological acts, are all types of behavior. Just about everything you and your body do can be considered behavior. To paraphrase Skinner, skin is not a boundary to behavior. Recognizing internal behavior as well as external behavior is often referred to as *radical behaviorism.*

RADICAL BEHAVIORISM

Psychology and philosophy books talk about several different versions of behaviorism, but *radical behaviorism* is the type of behaviorism associated with Skinner and is the basis of ABA. There are enough differences between radical behaviorism and other versions of behaviorism to keep philosophers happily arguing with each other forever. The big difference though that could be important to us is that Skinner and radical behaviorism accept and treat private events such as thoughts, images and feelings as being behaviors too, just like the kinds of behaviors that can be more easily seen by others. But these internal behaviors can be more difficult to observe, measure, count, and work with than external behaviors.

FREQUENCY AND RATE

So to complete our definition of behavior, how do we *measure* an act? Well, there are a variety of ways. The simplest is just to count how many times a particular behavior occurs. We call this count of a behavior its *frequency*. But the frequency alone usually isn't very helpful. Suppose we say a baseball player got two hits. At first that might seem pretty good if we assume we're talking about just one game, but we really haven't said yet how many times at bat the player had. What if those two hits were for a whole season? Not so good. So the number of behaviors must be put into a meaningful

context so that it makes sense, such as the number of opportunities or length of time. This context gives us a more useful measure than frequency alone, which we call the *rate* of behavior. For baseball players we calculate their batting average by dividing the number of hits by the number of times at bat. (Well, sort of. We don't count bases on balls and… Oh, never mind, you get the idea.) We will talk more about ways to observe and measure behaviors later. So finally we can simply say that behavior is anything a living person does outside or inside their body that can be observed and counted in some way.

Behaviors that look alike to an observer are said to have similar *topography*.

RESPONSE CLASS, CLASS OF BEHAVIOR

On the other hand, behaviors that are similar to each other because of their effects, regardless of their appearance, are said to belong to the same *response class*. In other words, behaviors that accomplish the same purpose belong to the same response class. It doesn't matter if it looks as if Dick is doing two completely different things. There is an old saying that there is more than one way to skin a cat. I've never skinned a cat myself, so I'm not speaking from personal experience, but if there is more than one way, then all these ways can be considered to belong to the same response class.

Another simple example that I have experienced myself is changing my TV station. I can just sit where I am and press a button on my remote control, or I can walk over to the TV and turn a dial on the control panel (it's a really old TV). It might look as if I'm doing two different things, but they have the same effect—changing the station. Therefore, they belong to the same response class.

LEARNING

Most human behavior is the result of one or more of three factors usually acting together. These three factors are:

1. our heredity or genetic endowment
2. physiological changes that happen to us after conception (such as maturation and the effects of disease and accidents)
3. behavior-changing experiences that we call *learning*.

Numerous books have been written about the seemingly countless theories of learning that scholars have proposed. Those definitions that include an objective, scientific study of learning can mostly be boiled down to a more practical definition of learning as *any relatively permanent change in behavior that results from interaction with the environment.*

When we hear the word *environment* we usually think of trees, rivers, meadows, oceans, and other parts of our natural environment. These are certainly important, but when we're talking about behavior, other parts of our physical and social environment are important too. Human-made objects such as tools, books, computers, and TV sets, as well as the other people around us and their behavior, are all parts of our environment and can influence our behavior.

Using genetic engineering to change our behavior by changing our genetic makeup is far from being practical, and bringing about other physical changes through medical treatments such as drugs does not have reliable and specific results, is not always reversible, and risks side effects. So this leaves learning as our last and best chance to change behavior. Of these three factors, learning is the one we can do the most about. But most of the time the learning that we do is unplanned, somewhat random, and not very efficient. Since learning takes place through interaction with the environment, learning and therefore behavior can best be modified through planned changes of the environment and learning process.

ENVIRONMENTS

Now that I've mentioned the environment and that it has a lot to do with behavior, I guess I should explain more about what I mean by *environment.* Sometimes we hear people talking about different kinds of environments. Here are some names for environments I bet you don't hear every day.

NATURAL ENVIRONMENT

When most of us hear the *natural environment* mentioned we first think about the great outdoors. But natural environment can have another meaning. When we put our behaviorist hats on, we start thinking more about social environments. When we're thinking

about social environments, the natural environment pretty much means what we often call the *real world*, where most of us spend most of our time. For children, part of the natural environment would be mainstream classrooms, without any special accommodations, modifications, or specialized instruction. While there certainly are factors operating in the natural environment that will influence their behavior, they are the same things that just about everyone else is exposed to. The natural environment does a pretty good job of socializing most people, but sometimes things can get a bit wild in the natural environment and end up shaping all sorts of maladaptive antisocial and dysfunctional behaviors.

PROSTHETIC ENVIRONMENT

A *prosthetic environment* is an environment that helps an individual to behave more like his or her typical peers. Just as a prosthetic device such as an artificial limb or hearing aid may help "level the playing field" as some might say, a prosthetic environment may be a very highly structured arrangement, perhaps with lots of help built in to encourage the individual to behave more adaptively and appropriately. A prosthetic environment helps teach and/or maintain a particular pattern of behavior that the child would not currently perform dependably in the natural environment. Perhaps Dick doesn't perform the behavior in the natural environment because he hasn't learned the skill yet or perhaps because there is no reason or motivation for him the way the natural environment is currently set up. If Dick has attention deficit hyperactivity disorder (ADHD), for example, he might more easily pay attention to his teacher in a classroom that does not have a lot of novel stimulation. If Dick has a habit of looking out of the window to watch another class at recess, and maybe starts daydreaming about being out there too, perhaps drawing the window shades during recess time would help minimize distractions. On the other hand, a lot of rapid changes in stimuli, if well planned, may help Dick focus better on the task at hand, like when he amazes everyone when he gets so absorbed by his fast-paced video games.

THERAPEUTIC ENVIRONMENT

A *therapeutic environment* is an environment that is intended to help the student to eventually become more independent of it and to be able to behave more like typical peers when in the natural environment. Sometimes a student with serious behavioral problems needs to be placed in a specialized self-contained classroom, for everyone's good. Intense treatment while placed in that specialized environment should make it possible for Dick to acquire the behavioral patterns he needs to learn to be eventually integrated back into the mainstream classroom and to succeed in the natural environment.

Although we might be able to make a pretty good guess, we don't really know for sure if an environment is prosthetic or therapeutic until the situation is naturalized again, and we can see if the new behavior continues appropriately or not. If the new behavior continues in the natural environment, then the prior situation functioned as a therapeutic environment. If the new behavior stops in the natural environment, then the prior situation functioned as a prosthetic environment. So sometimes an environment may be prosthetic and at other times the same environment may be therapeutic. We can't tell for sure just by looking at how the environment is structured or arranged; we really have to see what effect it has on behavior. Also, the same environment can at the same time be prosthetic for one behavior and therapeutic for another. Again, it depends on the effect the environment is having on each behavior.

BEHAVIOR MODIFICATION

Although ABA is a term that may be new to many of us, people who worked in public education during the second half of the twentieth century are likely to be more familiar with the term *behavior modification.* Behavior modification, sometimes referred to as "Behavior Mod," has been defined as "the application of experimentally derived laws of learning to human behavior" (Cautela 1970). Behavior modification is the result of years of scientific research conducted in laboratories and in natural settings, not just someone's hunch or unproven theory. What this boils down to is that everything that has been demonstrated about human learning is, by definition, a part of behavior modification. When we think about it, behavior

modification is always going on. We are always learning, unlearning, and relearning various behaviors, but most learning is random and inefficient. Many people think behavior modification sounds very complicated and that they could never learn its principles or be able to apply these principles systematically. But once they start to become familiar with basic principles of behavior modification they begin to realize that it often seems like common sense applied in a systematic and efficient manner.

ABA is one of several subcategories of behavior modification, along with behavior therapy, programmed instruction, precision teaching, and others. Many of the classroom behavior management techniques that have been commonly used in classrooms for several decades now, such as contingency contracting and point systems, when done right, are applications of ABA methods and procedures. But behavior modification does not include drugs, psychosurgery, unproven theories, or wishful thinking.

TARGET BEHAVIORS

While people are performing or *emitting* (as we sometimes say) behavior all the time, there are usually only a few behaviors that we are particularly interested in paying close attention to. Those behaviors targeted for change are often called *target behaviors*. A target behavior isn't necessarily a behavior we want to get rid of; it could also be an appropriate behavior that we want to strengthen.

RESPONSE

Sometimes we see or hear the word *response*. In general usage response is pretty much the same thing as behavior. But response in ABA usually refers to a behavior that immediately and predictably follows something in the environment.

TRIAL

A *trial* is the term for one try, attempt, repetition, or instance of a behavior, often in a situation set up to teach the behavior. Trial also sometimes refers to a set of more than one instance of the behavior.

Usually many trials are needed to learn something really well. (Practice! Practice! Practice!)

MALADAPTIVE BEHAVIOR

Behaviorists often describe behavior as being adaptive or maladaptive. Adaptive behaviors are usually useful socially acceptable behaviors that are effective or functional in serving their purpose. They usually work and they usually don't hurt anybody. On the other hand, *maladaptive behaviors* are behaviors that are not effective in achieving their goal and/or have other unwanted consequences. They may be socially or otherwise unacceptable because of their short- or long-term consequences for the individual who performs these behaviors or for their consequences or effects on others.

VERBAL BEHAVIOR

A very important ability that most humans have is the ability to use language to communicate with each other. Unfortunately, when this ability is hindered in some way it can make life very difficult. Communication ability is often seriously impaired in individuals with ASDs, but also for others with various forms of speech problems and certain learning disabilities. Behaviorists use the term *verbal behavior* (from Skinner's 1957 book of the same name, *Verbal Behavior*, which is considered one of his most important books) to refer not just to spoken language, but to other forms of communication as well, such as reading and writing. Sign language is a type of verbal behavior. Verbal behavior is such an important area, that ABA International has a journal entitled *The Analysis of Verbal Behavior* devoted exclusively to this topic.

COVERT BEHAVIOR

In everyday chit chat when we're talking about behavior, we usually think of behavior that can be noticed or observed by just about anyone paying attention. Behavior of this sort is sometimes described as being public or overt behavior, since it is at least potentially directly observable by the public. In the behavioral world the term *covert behavior* refers to behavior such as thinking, imaging, and

feeling that is not directly observable to the public. Other actions inside our bodies, such as heartbeats or brainwaves, are also considered covert behavior. Since these private events can be observed directly by the individual experiencing them or indirectly through the use of medical instruments, they are considered behaviors as well.

COLLATERAL BEHAVIOR

Collateral behaviors are behaviors that typically go together. The smiling and laughing of children while eating candy or ice cream would be an example of collateral behavior. We're probably most likely to hear about collateral behavior as it relates to verbal behavior that describes some covert, private, or internal events. For example, when he feels a toothache Dick might say "I have a toothache." Jane might say, "I am so happy!" when she is given a puppy for her birthday. While many children learn appropriate collateral verbal behavior as a normal part of their development, some children with communication weaknesses may have particular problems expressing their feelings and other internal states through speech.

Collateral verbal behaviors are commonly acquired or learned when adults make assumptions about how they think that the child must be feeling based on the circumstances. Then they essentially tell or name for the child how he or she must be feeling. When seeing Jane trip, fall, and land on her knee her mother might say "Oh Jane, your knee must really hurt!" For some children with ASDs, more direct methods are sometimes used to teach the appropriate collateral behavior.

CHAPTER 3

WHAT ARE ANTECEDENTS?

STIMULUS

One of the terms that you'll probably hear quite a bit when you are listening to a behaviorist talk is the word *stimulus*. In general, a stimulus is something that stimulates or gets a reaction from something else. A stimulus is often something that can be noticed or detected by our senses. An object, an odor, a sound, an event we see happening, or almost anything can be a stimulus.

Stimuli (plural for stimulus) that don't seem to affect behavior at all are called neutral stimuli. But there are many different kinds of stimuli that do affect our behavior in different ways. Stimuli that strengthen a behavior are called reinforcing stimuli and we'll talk a lot more about them in Chapter 4.

ANTECEDENTS

By *antecedents* or antecedent stimuli we mean things that happen or are already in place before the target behavior occurs. As we just said, many things going on don't seem to have any effect at all on the target behavior and are essentially neutral, at least as far as the target behavior is concerned. Other antecedents may signal that a particular behavior is likely to be reinforced or punished. A classic example is when a dinner bell or the cook's call that dinner is ready signals that if you go to the dining room, your behavior of going to the dining room is likely to be *reinforced* or rewarded with a good meal. Go to the dining room some other time—no food, no reinforcement. The dinner bell stimulus helps us to discriminate or tell the difference between the times that we will get a meal if we go to the dining room and the times that we won't get a meal. So the dinner bell in this case functions, operates, or works as a signal or cue called a *discriminative stimulus*.

DISCRIMINATIVE STIMULUS

Sulzer and Mayer (1972) described a *discriminative stimulus* as "a stimulus in the presence of which a given response is reinforced" (p.290). In some books you may see the symbol S^D, or S^d, used to stand for discriminative stimulus (with the D or d often printed as a superscript), or you might hear a speaker talking about an "Ess Dee." The speaker is simply pronouncing the initial letters, S and D, which really are a lot easier to say. Other terms like *cue*, *sign*, and *signal* are less formal, but convey the same general idea as S^D.

The S^D in the case of the dinner bell helps us to discriminate or notice when a particular behavior is likely to be reinforced, but an S^D could also signal that a behavior is likely to be punished. (In the case of the dinner bell, suppose liver is being served and you hate liver. Some people would consider being given a plate of liver to be a punishment.) A red traffic light is an S^D that signals that driving through an intersection at that time is likely to be punished, possibly by an accident or perhaps by getting a traffic ticket if the police are watching.

Antecedents that affect behavior can come in a variety of forms. An antecedent to a target behavior could be someone else's behavior, such as a teacher telling Jane to open her math book. It might be a sign in a school directing visitors to report to the office. Words in a book are S^Ds for the students' reading behavior. Often the same stimulus can occasion or help bring about different behaviors from different individuals. For example, a sign on a highway that says "Dennisport, Exit 9" will influence different drivers differently. Those drivers who want to go to Dennisport are much more likely to get off the highway at Exit 9, while those wanting to go on to Provincetown will just keep on driving along.

A math worksheet given to a student is an antecedent that influences student behavior too. The teacher wants the presence of the worksheet, perhaps together with verbal instructions, to influence the student to complete the math problems. If this does happen then the math paper and verbal instructions are S^Ds for the desired behavior—doing the math problems. This will typically be the result. But before new behaviors are well established the intended eventual S^D often isn't strong enough to lead consistently to the desired behavior. The student may engage in some other, perhaps

disruptive, type of behavior such as complaining or tantruming. Sometimes, besides the S^D additional cues or *prompts* are needed to get the ball rolling. When Jane is acting in a school play and forgets a line, the director might whisper the first words to Jane to get her started, or when Dick forgets the state capitals, his teacher might give him the hint that the capital of Rhode Island begins with "P." We should really think of these prompts as extra artificial S^Ds that are temporary aids that over time can be faded or reduced and eventually eliminated. It's like giving an extra clue or hint in a guessing game.

PROMPT

In everyday conversation one of the meanings of the word *prompt* is to assist someone in correctly answering a question or otherwise behaving appropriately for the situation at hand. And that's pretty much the same thing that prompt means in the ABA world. To us, a *prompt* is an antecedent (goes before) that helps get behaviors started. A prompt is a cue, a hint, a push, or some other assist to help get things going. Spoken directions, a demonstration such as modeling the target behavior, or even physical guidance, making hand signals, giving the first syllable of the answer to a question, can all be prompts.

There are times that we might need to give Dick some help to get him started performing a behavior. When it gets close to bed time I might be able to prompt Dick to get himself ready for bed by saying, "Dick get ready for bed now." And that works just fine. Or perhaps I may have to give more detailed and frequent prompts such as, "Dick, brush your teeth, put on your pajamas, use the toilet, and wash your hands and face."

Besides S^Ds there are also discriminative stimuli called S-delta ("Ess Delta," represented by the symbol S^Δ) that indicate that a particular behavior will *not* be reinforced. If there is a sign on the door of a shop that says "Open at 2" and you try to get in at 11:30, chances are that you will find the door locked and your attempt to open that door will not be reinforced by success. You are not punished for trying to open the door, but you are not reinforced either.

Jane is about to take a computerized one-minute math test. She will be shown a series of subtraction problems all involving numbers under 100. As each new problem appears on the computer screen she must quickly type in her answer to the problem and the next problem will immediately appear. Jane will earn one reward point for each correct answer. After one minute the color of the numbers on the screen changes from green to red. Although Jane can continue to type in answers after the color changes from green to red, Jane does not receive any more reward points no matter how many correct answers she types in, as long as the numbers are red. In this case green numbers are an S^D that correct answers will be reinforced, and red numbers are an S^Δ (S-delta) that correct answers will not be reinforced.

STIMULUS CONTROL

When a behavior is clearly influenced so that it consistently occurs when its S^D is there, but doesn't happen or at least doesn't happen the same way without the S^D, we sometimes say the behavior is under *stimulus control*. Dick's mom may have been working on his manners by trying to teach him to say "Please" and "Thank you." When Mom is with him he remembers and follows through. When she is not around he forgets to say "Thank you." Dick's polite "Thank you" behavior is still under the stimulus control of his mother.

SETTING EVENT

While many of the antecedents we have talked about so far have been behaviors performed by others, the term *setting event* refers to other kinds of antecedents, including our bodily states and the presence of inanimate objects that influence behavior as well. For example, someone being very hungry or very tired as opposed to having just eaten a big meal or having had a good night's sleep are certainly bodily states that can affect behavior in different ways. When you're hungry at 7:00 that is a setting event that makes it more likely that you'll eat a big breakfast when breakfast is served at 7:30. Differences in setting events can help explain why Jane might react very differently to seemingly identical stimuli at different times.

Other terms that are widely used to describe pretty much the same idea as setting event include *motivating operation* and *establishing operation.*

MOTIVATING OPERATION (MO)/ ESTABLISHING OPERATION (EO)

When something happens to make something else more or less reinforcing it is sometimes called a *motivating operation* (*MO*) or an *establishing operation* (*EO*). Just as it sounds, motivating operations are to do with motivation. Motivation and reinforcement go hand in hand. Simply put, being motivated involves acting in ways to increase our level of reinforcement and/or decrease our aversive experiences. We can say that the more motivating something is to us the more reinforcing it usually is (or at least the more reinforcing we expect it to be). As things become more or less reinforcing they can become more or less motivating to us.

An MO or EO can be a naturally occurring event or it can be something that is intentionally arranged. This can be doing something to increase the ability of the stimuli we hope to use as reinforcers to really work as reinforcers, or it could be doing things to weaken the reinforcing ability of the reinforcers maintaining the maladaptive behavior. EO is the older term, but both EO and MO are still commonly used. Like many words in the English language, the precise meaning of these terms has changed over time. EO and MO are not always used consistently, so, depending on where you come across these terms, you might find the explanations confusing. I'll try to give an explanation that is consistent with generally accepted use. These days, MO is being used more often as a general term to describe making either a strengthening or a weakening change in a reinforcer. On the other hand, EO is more often limited to describing only events that strengthen the effectiveness of a reinforcer or that establish something as a reinforcer in the first place.

ABOLISHING OPERATION (AO)

We now also have a newer term—*abolishing operation* (*AO*). An AO is something that happens that has the effect of abolishing or weakening a reinforcer. A common example of at least a temporary

AO is satiation. If Dick eats too much candy and gets sick to his stomach, than he has probably temporarily abolished the effectiveness of candy as a reinforcer. In some cases the candy may even at least temporarily become aversive and work as a punisher.

EOs/MOs can be confused with S^Ds. (Remember them?) It might help to remember that MOs have to do with how much we might be reinforced by something (think motive) while S^Ds have to do with whether or not that reinforcer is potentially available to us (think opportunity).

MOs often involve establishing states of deprivation or satiation (having too little or too much of something). For example, keeping with the food/eating theme, rather than going grocery shopping just before dinner, weight-conscious adults might be wise to do their grocery shopping right after dinner, thereby strengthening their ability to resist any temptations to buy (and eat) extra snack food, desserts, and the like. By eating just before shopping we have temporarily weakened (or abolished, as some would say) food as an effective reinforcer. We may say that eating dinner before grocery shopping is our motivating operation to make goodies at the grocery store easier to avoid.

Following up an earlier example, if we intend to use food as a reinforcer during Dick's math class, we probably want to be sure that he hasn't eaten for a while before math class. If Dick is hungry he's more likely to work for food and we have established food as a more powerful reinforcer in this situation. So to help something become more effective as a reinforcer we want to be sure that Dick hasn't had too much of that reinforcer lately. We also want to be sure that, at least for the time being, the only way that Dick can get this particular reinforcer is by performing the new behavior that we want him to perform.

An MO that would be likely to make something less effective as a reinforcer would be to make the reinforcer noncontingently or freely available to Jane. In other words Jane still gets the "reinforcer" no matter what she does or doesn't do. For example, suppose Dick and Jane are outside playing. Dick is playing with his basketball and Jane is playing with a soccer ball. Dick asks Jane to play basketball with him, but Jane declines because she wants to continue to play soccer. As they continue to play by themselves, the temperature

begins to drop and both are getting cold. Dick escapes from the cold by putting on both the sweater and jacket that he has with him, but Jane has neither and is still getting colder. So Dick tells Jane that if she will play basketball with him she can borrow his jacket. Reluctantly, Jane agrees. After they play basketball for a few minutes their mother comes along with a sweater in her hand and calls to Jane: "Jane, it's cold out, come and put your sweater on!" This can be thought of as an AO in that by providing Jane with a sweater to keep warm, regardless of what she does, Mother has essentially neutralized the reinforcing ability of Dick's jacket in this situation. Now with a sweater of her own, Dick's jacket is no longer a powerful enough reinforcer to keep Jane playing basketball. Wearing her own sweater, Jane goes back to playing soccer. In this story the reinforcing value of Dick's jacket is first increased by the naturally occurring MO of the drop in temperature. Then, when Mother comes along with Jane's sweater, which is another MO in this situation, the reinforcing value of Dick's jacket drops again. This sounds like some stock I once owned.

So, to summarize, a *motivating operation*, commonly referred to as an MO, changes the strength of a reinforcer, i.e. how motivating or reinforcing it actually is. If we want to get more specific we can talk about two kinds of MOs—establishing operations (EO) and abolishing operations (AO)—that change the effectiveness of stimuli to influence behavior. Just as their names indicate, an establishing operation makes (establishes) something work as a reinforcer in the first place or strengthens an already existing reinforcer while an abolishing operation abolishes or weakens a reinforcer's effectiveness. MOs help us understand why people might react very differently to the same stimuli in different situations or even in apparently similar situations but at different times.

If you go on to read more advanced books about ABA you might run into *UMO* or *CMO*. The extra letter simply indicates whether the MO is an unconditioned motivating operation (UMO), i.e., you were born that way, or a conditioned motivating operation (CMO) i.e., something you learned. You might even see these terms with letters such as S, R, and T behind them, but that's more than you need, or maybe even want, to know right now.

PRECURSORS

Generally speaking, a *precursor* is something that comes before something else. We could say that tomatoes, lettuce, cucumbers, and croutons are precursors to a salad. If we see tomatoes, lettuce, cucumber, and croutons on the kitchen counter, that might tip us off that a salad is coming soon. If the sky gets cloudy, the temperature falls, and the wind picks up, those events could be precursors that warn us that a storm is on the way.

There are behavioral precursors too. If we see that Jane has stopped running around the house, is sitting quietly on the sofa, yawning, and having difficulty keeping her eyes open, that's a signal to us that she will soon fall asleep. Behavioral precursors can warn us that trouble can be coming. We might notice that Dick often stops talking, tenses his muscles and starts tapping his foot before having a tantrum or meltdown. If we're paying attention and notice these precursors starting to occur we have a chance to act quickly to diffuse the situation (perhaps by prompting Dick to use a previously taught self-control strategy such as progressive muscle relaxation) before the explosion occurs.

Precursor can sometimes be confused with *trigger*. Trigger is more of an informal term for setting events that "set off" certain behaviors, chains, or patterns of behaviors, while precursors are behaviors that often occur in the early stages of these behavioral patterns once they are already underway.

ELICIT AND EMIT

Two other words that we often hear when behaviorists are talking about someone performing a behavior are *elicit* and *emit*. We say that a stimulus *elicits* a response or behavior when the behavior really has to happen, like in an involuntary reflex. You know, when the doctor whacks you on the knee with that little rubber hammer and you automatically kick, or when a sudden bright light elicits an eye blink. On the other hand, sometimes a behavior occurs and we don't see anything that made it absolutely positively have to happen. Maybe we have no clue as to why Dick did whatever he did, and it appears to be a more voluntary behavior, even if it is influenced by its consequences. In these situations someone might say Dick *emitted*

the behavior. While sitting next to Jane in church on Sunday perhaps Dick reaches out his hand and starts tickling Jane. Did he really have to do that? No. Did he do it? Yes. Dick emitted the tickling behavior.

CHAPTER 4

WHAT ARE CONSEQUENCES?

It is often said that someone will have to "suffer the consequences" for something that they did. That certainly makes it sound as if consequences are quite unpleasant and can give us the impression that consequences aren't very nice. But that's just one kind of consequence.

CONSEQUENCES

When we talk about *consequences*, we're talking about what happens after the target behavior occurs, usually immediately after. While a consequence might be something unpleasant, it might also be something quite pleasant. Consequences that follow a behavior with a certain degree of regularity often begin to have an effect on how frequently the behavior that they follow occurs. The process through which these consequences influence behavior is called *operant conditioning*.

OPERANT CONDITIONING

Operant conditioning, sometimes called operant learning, is the most common of the various ways in which learning takes place. In operant conditioning the frequency with which a certain behavior occurs depends on what happens right after it occurs, that is, the behavior's immediate *consequences*. Doesn't that sound kind of familiar? Operant conditioning is the underlying principle of most of the behavior modification techniques used in ABA. Although some examples will be included, our emphasis will be on basic principles and guidelines so that you can then adapt them to your own unique needs. If you happen to be a psychology major or graduate student in a field related to psychology or if you just really want to learn a lot about operant conditioning, I recommend a book entitled *A Primer of Operant Conditioning* by G. S. Reynolds. According to Reynolds,

"*operant conditioning* refers to a process in which the frequency of occurrence of a bit of behavior is modified by the consequences of the behavior" (Reynolds 1968, p.1). Basically it's the idea that behavior is a function of its consequences, or that whatever you do is strongly influenced by the events that follow the behavior, by what happens right after you do it.

If something you like happens (for example, the peppermint candy you ate tasted really good to you), your behavior has probably been reinforced and you're a bit more likely to do the same thing again sometime (you will probably reach for another piece of peppermint candy). If something you don't like happens (for example, you don't like the licorice candy you ate), you are less likely to do the same thing again (you will probably not reach for a second licorice candy). When talking with behaviorists, it is important to remember that it is behavior, not people, that is reinforced.

POSITIVE REINFORCEMENT

When the consequences of behavior are such that they make the behavior more likely to occur again in the future, we call it *positive reinforcement*. Usually the reinforcer is something that the reinforced individual experiences as pleasurable or rewarding, like a hot fudge sundae. The reinforcer can come in either tangible or intangible form, such as a piece of candy or a smile from someone we like. It can be very tempting to call a reinforcer a reward. Rewards are often reinforcing, but not always. But we can't assume in advance that a reward intended to be a reinforcer will actually work as a reinforcer. Believe it or not, there are a few people here and there who actually don't like hot fudge sundaes!

If you are familiar with the literature in this area, you might find the term *Law of Effect* (developed by E. L. Thorndike in the early 1900s) used to emphasize the importance of the actual effects of behavior in the learning process. An example of the learning operation of positive reinforcement could involve Dick calling out in class without raising his hand. If Dick gets what he wants, the attention of the teacher and/or his classmates, then he has been reinforced for calling out and will be more likely to call out again in the future. Reinforcing a behavior that we want to happen again

is the best way to increase its strength and frequency. If Dick were in a situation where nobody paid any attention to him when he called out, but he could get attention by raising his hand first, he would soon stop calling out and begin raising his hand.

Sometimes people talk about learning by trial and error. Trial and success is a better name for this process. We try behaving in different ways until we find something that works to get the consequence or result we want. The behavior that is finally successful in getting the desired help is positively reinforced. The underlying idea of positive reinforcement is to "catch them being good," and reinforce Jane's good behavior.

Depending on how you look at it, there can be lots of different kinds of reinforcers, and sometimes the terminology used in describing them can be confusing. And, I hate to say it, but not all of the "experts" use these terms in exactly the same way, so that can make it even more confusing. Here are some of the terms that are used to differentiate different types of reinforcers and what these terms commonly mean. I already mentioned that reinforcers can be tangible or intangible. Sometimes we hear talk about *primary* and *secondary* or *conditioned* reinforcers.

PRIMARY REINFORCER

A *primary reinforcer* is reinforcing for itself. Primary reinforcers are generally things that help keep us alive. Food or water is naturally reinforcing to just about everyone who is hungry or thirsty. (The states of being hungry and thirsty are setting events.)

CONDITIONED REINFORCER, SECONDARY REINFORCER

Conditioned or *secondary reinforcers* such as verbal praise or compliments (or merit badges or awards) are not intrinsically reinforcing themselves, but only begin to work as reinforcers after they become associated with primary reinforcers that often follow them.

PAIRING

When a neutral stimulus, perhaps a token or even certain words, is presented together with a reinforcer so that the neutral stimulus

eventually becomes a conditioned, secondary, or generalized reinforcer itself, it is called *pairing*. Even a person, such as a teacher or parent, who is the source through which reinforcers are received, can become a conditioned reinforcer as a result of the ongoing pairing with other reinforcers. Grandparents who love to shower their grandchildren with lots of gifts are examples of individuals who commonly become powerful conditioned reinforcers.

Another distinction sometimes made is between extrinsic and intrinsic reinforcers.

EXTRINSIC REINFORCERS

Extrinsic reinforcers are generally tangible or otherwise observable consequences. These are the reinforcers that we can usually see, feel, touch etc. outside of the person receiving the reinforcement. Dick might eat his vegetables to get a piece of pie (extrinsic reinforcement) while Jane might eat her vegetables simply because she likes vegetables (intrinsic reinforcement).

INTRINSIC REINFORCERS

Sometimes, however, the act of doing something may be reinforcing by itself and we say that it is intrinsically reinforcing or an *intrinsic reinforcer*. Creative activities are often considered to be intrinsically reinforcing. For Dick, playing his guitar is intrinsically reinforcing. For Jane, maybe painting a picture of some flowers is intrinsically reinforcing. You don't have to add any artificial consequences to get Dick to practice his guitar or Jane to paint; you just give them the opportunity.

AUTOMATIC REINFORCEMENT

Reinforcement that doesn't include any social interaction with others is sometimes called *automatic reinforcement*. Cigarette smoking reinforced by the effects of nicotine and self-stimulating behavioral patterns are examples of automatic reinforcement and many self-injurious behaviors (SIBs) are maintained by automatic reinforcement. Other behavior patterns, such as the prolonged rocking and hand flapping that are sometimes seen in children with

various forms of autism, are likely to be examples of automatic reinforcement as well. Since many children with ASDs do not seem to be as sensitive to social reinforcers as others, automatic reinforcement becomes more powerful for them.

Even though some of these behaviors (such as self-biting and eye poking) can eventually result in considerable harm to the child engaging in them, these long-term consequences are outweighed by their immediate short-term consequences such as anxiety reduction or other physiological responses that seem to keep these maladaptive behaviors going strong. For just about all of us, scratching an itch can be thought of as automatic reinforcement.

SOCIAL REINFORCEMENT

Social reinforcement is a type of secondary reinforcement that involves getting attention from others. Depending on the social circumstances and whom the attention is coming from, their attention may or may not be reinforcing. The same event can involve both primary and secondary reinforcement. When I was in graduate school one of my professors, Joe Cautela, loved to go out to eat with groups of his colleagues and students. We often found ourselves at a seafood restaurant and Joe always seemed to have a bucket of clams in front of him. As the conversation around the table went on, Joe would pass out clams as reinforcers when someone made a comment that he particularly liked. So the clams were primary reinforcers if you were hungry and liked clams, but they were also secondary reinforcers because of what they represented, acknowledgement that the master thought you said something smart and that you were receiving his attention and approval.

GENERALIZED REINFORCER

Another type of reinforcer is a *generalized reinforcer*, such as money. In addition to being a conditioned reinforcer, generalized reinforcers such as money, tokens, stars, chips, points, and the like can have the reinforcing effect of the various reinforcers for which they can be exchanged.

BACKUP REINFORCER

Generalized reinforcers would not be effective for long unless they had *backup reinforcers* that could be received in exchange for the generalized reinforcers. These backup reinforcers (e.g. a TV, car, clothes, toys, books, snacks, privileges, etc.) are what the generalized reinforcers can buy.

EDIBLES

When a bit of food is used as a reinforcer it is often referred to as an *edible*. Usually small pieces of food, such as M&Ms, nuts, crackers, grapes, and the like, are used as edibles. In the grand scheme of things, using food, particularly candy and the less healthy stuff, is intended as a temporary situation that can, it is hoped, eventually be replaced by social reinforcers or natural reinforcers.

NATURAL REINFORCER

When we're talking about *natural reinforcers*, we're generally talking about reinforcing consequences that come along without being artificially contrived or arranged by someone. These are the reinforcers that we run into regularly as a normal, natural part of our everyday lives. Since a consequence could be reinforcement but could also be punishment or extinction, we can think of natural reinforcement as one type of natural consequence.

CONTRIVED REINFORCEMENT

Contrived reinforcement is a term used by Skinner to refer to specially arranged artificial consequences to behavior. Reinforcers that do not follow *naturally* from the behavior are contrived, whether we are talking about giving Dick an M&M for staying in his chair for five minutes, letting Jane watch 30 minutes of TV after completing her homework, or giving you a paycheck on Friday afternoon after you've gone to work all week.

In many cases the hope is that contrived reinforcement will be a temporary thing until natural reinforcers take over and maintain the behavior. This is when something involved in the act itself may be intrinsically reinforcing, such as when an artist or other crafts

person is reinforced by the act of painting or working at their craft and by the enjoyment of their finished product. In teaching social behavior we may need to use contrived reinforcers to get Jane to start conversations or play with classmates, regardless of how awkward her first attempts are. As time goes by and she becomes more socially skilled, it is hoped that the natural consequences of the reactions of her peers will continue to maintain her increasingly skilled behavior and the contrived reinforcers can be phased out (like with those edibles we just talked about).

As long as we are talking about reinforcement and reinforcers, there are a few more important points we need to keep in mind. First, reinforcers are idiosyncratic. That is, they are highly individualized and personal. What works as a reinforcer for you may not work as a reinforcer for me. Different strokes for different folks. We all have different tastes. Dick might prefer anchovies on his pizza while mushrooms work better for Jane. Personally, I never met a pizza I didn't like.

SATIATION

A second important consideration has to do with our state of *satiation* or deprivation with regard to the intended reinforcer. Most of the time chocolate ice cream may be a positive reinforcer for most people. But if you've just had a three-scoop chocolate ice cream cone and a big piece of chocolate cake at a birthday party, you may have had more than your fill of chocolate for now. You are satiated. If you had to eat more chocolate then, instead of being a reinforcer, it might be more of a punisher. But after time passes you eventually recover your taste for chocolate and it functions, or works, as a reinforcer again. As time continues to pass and you still do not get your chocolate, you may feel deprived of chocolate, even crave chocolate, and in this state of deprivation, chocolate could be a very powerful reinforcer.

So sometimes in some situations a particular stimulus is a reinforcer and at other times or in other situations the same thing can be useless or, worse still, have an unpleasant, aversive effect. It may actually punish or reduce the behavior we were hoping to strengthen. This can be pretty confusing. In everyday life we are dealing with generalized reinforcers like money so it's easy to

see how we can get in the habit of thinking of something that is sometimes a reinforcer as always being a reinforcer. (After all, isn't money almost always reinforcing for almost everyone?) But the truth is that rather than defining a reinforcer as the object or situation itself, we have to consider what effect it has, how it functions or works in a particular situation, to determine whether or not it truly is a reinforcer, here and now. We cannot take it for granted that once a reinforcer, always a reinforcer. There's an old saying in ABA that "A reinforcer is only a reinforcer if it reinforces." When we get to Chapter 6 we'll talk about ways to figure out what might make a good reinforcer and what might not. The bottom line is: if the consequence of the behavior makes it more likely that the behavior will occur again, the behavior has been reinforced. Even if we gave someone a million dollars to perform the behavior, if the behavior isn't more likely to occur again, then it was not reinforced.

So satiation is another term you are likely to hear from time to time because it really is an important concept. Remember, if we want our intended reinforcers to be effective we need to be alert to when Dick or Jane starts to tire of them and get bored, so we can make helpful changes. The good news is that after a while without those tired old former reinforcers, they sometimes recover their reinforcing abilities. Absence makes the heart grow fonder.

HABITUATION

Habituation is basically getting used to something. Usually new or novel stimuli get our attention more than they do after they have been around for a while and become the "same old same old." Sometimes habituation is for the better, like when we get desensitized to a previously aversive stimulus, such as getting used to a bad smell or an annoying background noise. On the other hand we also get used to and are sometimes indifferent about things that we like and which once may have been usable as positive reinforcers. Remember satiation?

So as you can see, *the same thing isn't always a reinforcer just because it was once a reinforcer*. There is no such thing as a universal reinforcer or punisher, something that is always reinforcing or always punishing for everyone in every situation. Do you remember that old folk tale

about throwing Br'er Rabbit into the briar patch? What was intended as a punishing torture turned out to be the greatest reinforcer of all for Br'er Rabbit.

If you've been paying attention you might remember that I've said that before, and I'll probably say it again, because it really is one of the most important things to remember about reinforcers. *The same thing isn't always a reinforcer just because it was once a reinforcer.* There, I was right, I did say it again.

Whether or not something is a reinforcer for a particular person in a particular situation today, I hope you remember that things can happen, both planned and unplanned events, that make these things more reinforcing or less reinforcing at other times. And I'm sure you aren't surprised to hear that there are special terms used to describe making a stimulus more or less reinforcing. One reason you shouldn't be surprised is that we already talked about a couple of these terms back in Chapter 3.

So, to refresh your memory: When something happens to make something else more or less reinforcing it is called a *motivating operation* (*MO*) or an *establishing operation* (*EO*). An MO can be a naturally occurring event or it can be something that is intentionally arranged. This can be doing something to increase the ability of the stimuli we hope to use as reinforcers to really work as reinforcers, or it could be doing things to weaken the reinforcing ability of the reinforcers maintaining the maladaptive behavior, known as an *abolishing operation* (*AO*).

Some behaviorists like to think of reinforcers that motivate people to act in various ways as falling into four categories. These are reinforcers that are tangible objects, reinforcers that involve sensory stimulation, reinforcers that include social attention from others, and a type of reinforcement that involves escape or avoidance from unpleasant circumstances called negative reinforcement, and that's what we will talk about next.

NEGATIVE REINFORCEMENT

In addition to positive reinforcement, there is another kind of reinforcement called *negative reinforcement.* A very common misunderstanding is to confuse negative reinforcement with

punishment. They are not the same thing. Actually, negative reinforcement is quite different from punishment, which we will talk more about in a few pages. *Negative reinforcement does not weaken behavior*. Negative reinforcement is rather a second operation through which the frequency of a behavior is actually increased or strengthened. In negative reinforcement, behavior is increased by stopping an unpleasant or *aversive* condition as soon as the desired behavior occurs. Instead of presenting or adding something pleasant, we remove or subtract something unpleasant. A classic example of negative reinforcement involves seatbelt safety systems built into many cars in years past. If you started the engine before having your seatbelt buckled, an annoying alarm buzzer would go off and in many cases continue buzzing until you either fastened your seatbelt or turned off the engine. By buckling their seatbelts, drivers and passengers were able to put an end to the annoying aversive sound and ride along in peace and quiet. Motorists were then more likely to fasten their seatbelts in the future and their seatbelt-fastening behavior had been negatively reinforced.

There are also many examples of negative reinforcement involving social interactions. Who has not seen (or experienced first hand) a child in a supermarket who keeps pestering a parent to buy this or that until the embarrassed parent is worn down and eventually gives in? Another example is the mother who learns that she can stop her baby's crying, which most people would consider an aversive situation, by going to the baby whenever she begins to cry. Since Mother is being negatively reinforced by the end of the crying, chances are she will end up going to the baby more and more when the baby cries. But there are two sides to everything. Mother may be learning that by going to Baby Jane when Jane is crying she can stop Jane's crying right away. Baby Jane, on the other hand, is also learning that she can get positive reinforcement, her mother's attention, anytime she wants to simply by crying, and in the long run she will probably cry even more often than before.

In schools it is common to see students who have learned to keep pestering, trying this approach with their teacher, often with mixed results. In the real world (or *natural environment*, as behaviorists like to call it) negative reinforcement is often a two-way street. The person who is negatively reinforced for doing whatever they did to end the

unpleasant situation has just reinforced the unwanted behavior of the other person who was making the situation unpleasant in the first place.

Dick might really hate reading aloud in class. When his teacher says to the class, "Take out your reading book now, we are going to read aloud the story starting on page twenty-five," Dick starts disrupting the class by pushing the papers off the desk of the student sitting next to him. The teacher sees this and sends Dick out of the class. This removes what to the teacher is an aversive stimulus, Dick's behavior. But it also enables Dick to get away from what to him is aversive, that is, having to read aloud in class. Consequently, Dick will probably be more likely to act up again the next time oral reading comes along. So both Dick and his teacher have been negatively reinforced, Dick by acting up and getting out of oral reading, and the teacher by throwing Dick out of class and not having to put up with his disruptive behavior (at least not for now).

It can be really helpful to think through these situations from the other person's point of view. A friend told me a story about his grandmother and their family dog. The dog used to spend a lot of time begging at the dinner table. This annoyed Grandma to no end. Thinking that she would get the dog to go away, Grandma would often give old "Lucky Dog" a bit of food, usually a piece of meat, from the table. Lucky immediately took the food away and enjoyed her snack in private while briefly giving Grandma a break. But Lucky would soon be back, looking for more. After enjoying her few moments of relief from Lucky's begging, Grandma would become frustrated again, saying something like, "I don't understand why that dog's here again, I gave her what she wanted!" In this case we had two good examples of reinforcement. First, Grandma's unintentional use of positive reinforcement to reinforce Lucky's begging at the table, which, as you probably guessed, increased. Second, Lucky, by immediately (but briefly) leaving the table area, used negative reinforcement to get Grandma to give her more snacks from the table.

ESCAPE

There are two types of negative reinforcement. The first is *escape*, in which the behavior puts an end to an already existing aversive situation. When the alarm buzzer goes off on a clock in the morning we reach over and turn it off to escape from the annoying noise. (If we really want to make the alarm clock more effective, the alarm should be placed out of reach of the bed to get more *waking behavior* from us and make it even less likely that we'll fall back to sleep after we turn it off.) If a sudden rainstorm comes up while children are playing outside, they quickly run for cover to escape from the cold, wet rain.

AVOIDANCE

The second type of negative reinforcement is called *avoidance*. In this case we behave in a certain way to avoid the aversive event before it occurs. Dick might turn around and walk in another direction when he sees a bully ahead. The use of caller ID features on telephones is negatively reinforced by avoiding unwanted calls. If we are driving along a bit too fast and spot a police car on the side of the road ahead, chances are we'll slow down to avoid getting a ticket. Much of the legal system is based on avoidance. We do or do not do certain things to avoid legal consequences such as fines, jail and other aversive consequences.

With older children and adolescents we can often see negative reinforcement at work in peer pressure situations. A high school student might be teased by his or her peers until finally giving in, to escape from the teasing, and begin smoking or drinking. Others may join in to avoid the teasing altogether.

To help understand the difference between escape and avoidance, think of what might happen if you are outside when it starts raining. You begin to get wet, and to *escape* from getting wet, you put up your umbrella, if you're lucky enough to have one with you, or perhaps you find shelter under an overhang, or maybe you go back indoors. You were getting wet, for a while, which may have been aversive to you, but then you escaped from the aversive situation. Perhaps after you've been caught in the rain a few times you've learned that when you see rain clouds in the sky it's a good idea to take an

umbrella with you when you go out if you want to *avoid* getting wet. If it actually does begin to rain you can now *avoid* getting wet at all by getting that umbrella up before it rains enough to get you wet. These are both examples of negative reinforcement, escape, and avoidance.

Besides these operations that increase behavior there are three operations that decrease behavior.

EXTINCTION

If we want to decrease the frequency of a particular behavior we should make sure that when the target behavior does occur, nothing follows it that would encourage or reinforce it. The process through which behavior is eliminated by withholding reinforcement is called *extinction.* If nobody laughs (positive reinforcer) when we tell jokes, chances are our joke-telling behavior will soon become a thing of the past (extinguished). It is common to see teachers ignoring students who call out answers in class without raising their hands. This is what the mother mentioned earlier might have done when little Jane began whining (assuming, of course, that Mother was satisfied there wasn't any appropriate reason for Jane's whining).

EXTINCTION BURST

In an ideal situation extinction is a good way to deal with tantrums. But it often takes a great deal of patience to extinguish behavior. Sometimes a person who is on an extinction schedule (i.e. he is no longer receiving reinforcement for a particular behavior) shows a temporary increase in the frequency and intensity of the target behavior before the behavior decreases. Dick may have learned that he can get his mother's attention by whining. But one day whining no longer works, so he whines even more strongly at first before he tires and gives up. This temporary increase is called an *extinction burst.* Unfortunately, this is where many people make their mistake. Dick's parents think the extinction isn't working and they give up when the target behavior (whining) increases (before it begins to decrease) and they give Dick whatever he wants to quiet him down. While Dick usually quiets down in the short run, his parents are actually reinforcing and strengthening the very behavior they

are trying to get rid of! Dick has in effect learned that his old amount of whining is no longer effective and that if he wants to be reinforced he must work even harder and resort to even longer and perhaps more intense episodes of whining for it to pay off. He has learned to perform at a higher level for the same or even less reinforcement. This is quite unfortunate since, with just a little more patience by his parents, Dick would have learned that whining was no longer an effective means of getting his own way. Now that his whining behavior has been cycled upward, it will take even longer to extinguish the whining if his parents try extinction again.

Extinction takes time and should not be attempted if you cannot allow enough time to extinguish the target behavior. You must be patient. If you try extinction and fail, chances are that the target behavior will only get worse. Actually, you are better off not attempting extinction if you can't put up with a temporary increase in the behavior, if you are not sure you can outwait the behavior, if the behavior is hurting someone, or if you are not sure you can be consistent.

Extinction is one of the most commonly attempted and goofed up procedures. When used properly, extinction should be used in combination with positive reinforcement of the appropriate behavior that you want to replace the troublesome behavior. Eliminating one way of receiving reinforcement without providing an acceptable alternative way to maintain the child's general level of reinforcement is looking for trouble. The child will seek reinforcement in other ways, and if we don't provide an acceptable way, chances are the child will develop another bad habit. Nonbehaviorists might call this *symptom substitution.*

If it is practical to use extinction in a given situation, using it in combination with reinforcement of an incompatible response is usually the best way to eliminate an unwanted behavior. For example, if we want to stop Jane from calling out in class, we should not only remove any reinforcement she gets for calling out (attention), but we should reinforce her for periods of quiet behavior, such as doing her worksheets. Since she can't be both calling out and quiet at the same time, and it is now being quiet that pays off, Jane will be much more likely to keep quiet.

SPONTANEOUS RECOVERY

Sometimes after a target behavior appears to have been eliminated, that nasty old target behavior suddenly shows up again. This turn of events is called *spontaneous recovery*. Like the extinction burst, spontaneous recovery isn't a surprise, usually doesn't last long, and as long as it isn't reinforced, goes away again. While an extinction burst usually occurs soon after extinction has begun, spontaneous recovery can happen much later and usually isn't as intense. The danger is the same as with the extinction burst, that is, not being consistent in keeping the extinction program in effect and accidentally reinforcing and cycling up the unwanted behavior.

In operant learning there are two additional means of decreasing undesirable behavior.

PUNISHMENT

In *punishment* the unwanted behavior is immediately followed by the presentation of a usually aversive consequence which results in a decrease in the frequency of the behavior that immediately preceded it. A classic but not recommended example could be spanking Dick for talking back to his parents. In a school setting, punishment might take the form of speaking sternly to Dick or having him write "I will not hit my classmates" 50 times. Although punishment sometimes appears to work, research has shown that the results of punishment are inconsistent and quite often include unwanted side effects, including the possibility of accidentally strengthening the target behavior.

One of the most controversial areas in behavior modification is the use of aversive control, particularly punishment. Many people are opposed to the use of punishment on ethical grounds. For others this is not a problem. And still others avoid the use of punishment as much as possible because of the practical problem of the many undesirable side effects it can have. Murray Sidman wrote a terrific book called *Coercion and its Fallout* (1989), which discusses the use of punishment and the problems it can lead to in great detail.

Whether you are ethically for or against punishment, since punishment is used widely in educational settings, it might be

worthwhile to mention some of the problems we can get into by using punishment.

First, one of the problems with using punishment is that experience and research both have found that punishment tends to suppress rather than eliminate behavior. What this means is that the punished individual may learn to not perform the punished behavior as long as the threat of punishment seems real, but once the likelihood of being punished goes away the punished behavior often comes back. It might have been temporarily suppressed or held down, but not eliminated. Using punishment is a good way to accidentally teach people to be sneaky.

Second, the effects of punishment often seem to be specific to the situations in which it is applied. There is less generalization to other situations than there usually is when positive reinforcement is used. Perhaps you know of a driver who tends to drive a bit over the speed limit. But our friend may have received a speeding ticket from the police along a particular stretch of highway. Now, although he often slows down to the posted speed limit when he drives through that section of road, he still typically drives a bit over the speed limit just about everywhere else. Sort of like kids doing *naughty* things when they can get away with it, such as swearing when no adult is around.

BEHAVIORAL CONTRAST

Actually, if a behavior is punished and suppressed in one situation, it may even increase in other situations where it is not punished. This is called *behavioral contrast*. Behavior that is suppressed in one setting may increase over its normal level in other settings. For example, suppose Dick throws an average of ten spitballs per class. In one class the teacher might use punishment to hold him down to three or four spitballs. When Dick gets in the next class, though, he might be up to 16 or 17 spitballs.

Third, the location in which the punishment occurs can also become aversive to the person who was punished there. How often do we hear stories about people who don't want to return to places where bad things happened to them? Their unpleasant emotional responses to these locations can make them go to great lengths to

avoid returning to "the scene of the crime," so to speak. Even when the geographical location of the aversive event really had nothing to do with it, it can still become a place to be avoided. Jane's avoidance of the girls' bathroom at school may have its roots in her having been teased by an older girl in the bathroom last year. Although the older girl has now moved on to another school, Jane is still very uneasy in the same school bathroom.

Fourth, the adult doing the punishing often becomes aversive to the child being punished, which makes it difficult for this adult to control that child's behavior in any other way. Remember earlier we talked about grandparents becoming conditioned reinforcers? In the same way the bestowers of punishment can become aversive stimuli themselves, bringing about fear and dislike from those who they punish. Often a school disciplinarian, such as a particularly strict assistant principal, falls into this trap. Once this happens, it becomes much more difficult for that individual to be effective using positive controls with students.

Fifth, some types of punishment are similar to behaviors we actually want to increase, or encourage a liking for. Assigning an extra page of math problems as a punishment risks unintentionally strengthening what might already be an aversion to math, certainly an unwanted side effect. If math is presented as a punishment, doing math may become even more unpleasant and result in much less math being done in the long run.

Sixth, some attempts at punishment may not be aversive to the person we are trying to punish. If Dick is told to stay after school with a teacher he likes for throwing something in class, he may be more likely to throw more stuff in class. Just as not every intended reinforcer is reinforcing to everyone, the same can be said for intended punishments. I remember a popular English teacher in my high-school days way back in the last century who was also one of the school's football coaches. It turned out that Mr. Fudd (not his real name, which has been changed to protect the innocent) was assigned as the after-school detention monitor on Mondays. During the fall football season, detention period on Mondays usually ended up being a 45-minute review of the highlights of that weekend's football game. Needless to say, the number of boys receiving detention on Mondays was much higher than the rest of the week as

many students intentionally engaged in minor infractions of school rules to earn the intended punishment (but functional reinforcer) of detention on Monday afternoons.

Seventh, just as reinforcers tend to satiate and become less effective if overused, many punishments lose their effectiveness if used too much. Remember habituation? Some just seem to be outgrown. Whereas a reprimand might be effective with a primary grade student, by the time the student reaches the sixth or seventh grade, reprimanding just doesn't work so well any more.

Eighth, since using punishment often works quickly in the short run to suppress unwanted behavior (even if it actually increases the target behavior in the long run) the person doing the punishing usually is reinforced (remember negative reinforcement?) for using punishment and may be a bit more likely to turn quickly to punishment again in the future. Without realizing it, the adult can slip into a trap of delivering more and more punishment without really reducing the long-term frequency of the unwanted behavior.

These are just some of the problems that can arise using punishment. However, keeping these potential problems in mind, we should add that punishment can be useful to get behaviors that are dangerous, either to the child or someone else, quickly suppressed and under temporary control until slower-acting positive reinforcement can more effectively replace the dangerous behavior with more acceptable alternatives.

RESPONSE COST

Another procedure used to reduce behaviors is called *response cost.*

Some people consider response cost to be a form of punishment, but without as many potential pitfalls. In response cost the undesirable behavior is followed by the loss or subtraction of something that the individual values. While this involves the immediate removal of something usually reinforcing, it is not the reinforcer for this particular target behavior. Paying a fine or a loss of privileges is a response cost. For example, a child who hits a classmate might lose his or her recess privilege for the day. Logically, response cost might be thought of as negative punishment (subtracting something nice and target behavior decreases). Response cost seems to be more effective and to have fewer undesirable side effects than punishment.

Trying to remember these five basic learning operations can be pretty tough sometimes. They can be confusing. Visualizing these operations on a grid, like Table 4.1, can make it easier to keep them straight.

TABLE 4.1 LEARNING OPERATIONS

	Strengthen/Increase Behavior	Weaken/Decrease Behavior
ADD	**Positive Reinforcement** Behavior occurs + Consequence of behavior → Effect on behavior Tell joke + Audience laughs → Tell joke more often ↑	**Punishment** Behavior occurs + Consequence of behavior → Effect on behavior Tell joke + Audience boos → Tell joke less often ↓
SUBTRACT	**Negative Reinforcement** **A. Avoidance** Behavior occurs – Consequence of behavior → Effect on behavior Put up umbrella before going out in rain – Avoid getting wet in future → Use umbrella in future ↑ **B. Escape** Behavior occurs – Consequence of behavior → Effect on behavior Put up umbrella after going out in the rain – Escape from getting wet → Use umbrella in future ↑	**Extinction** Behavior occurs – Consequence of behavior → Effect on behavior Tell joke – Audience doesn't laugh → Tell joke less often ↓ **Response Cost** Behavior occurs – Consequence of behavior → Effect on behavior Talk back to teacher – Lose recess time → Talk back to teacher less often ↓

REINFORCEMENT SCHEDULES

Obviously, people usually cannot be reinforced every single time they do what we want them to do. At least their behaviors can't always be reinforced in the natural environment. It just isn't practical in most real-world situations. This brings us to the problem of timing or scheduling reinforcement or *reinforcement schedules.*

CONTINUOUS REINFORCEMENT

When people receive reinforcement every time they perform a particular behavior, we say they are on a *continuous reinforcement* schedule. This is usually the quickest way to establish a new behavior. But continuous reinforcement is not necessary to maintain or keep behaviors going, and actually can be inefficient and not very practical. Once Dick is performing the desired behavior, the next step is to make sure that the new behavior is maintained, or becomes a regular habit. This is done through the use of any of a number of *intermittent* or *partial reinforcement* schedules.

INTERMITTENT REINFORCEMENT, PARTIAL REINFORCEMENT

In *intermittent reinforcement* (or *partial reinforcement*, as it is sometimes called) the behavior is reinforced sometimes, but not always. There are four basic or simple schedules of intermittent reinforcement. Two of these schedules are based on the number of behaviors performed and the other two schedules are based on the length of time that has passed since the last reinforced behavior occurred. In the real world, intermittent schedules are much more common than continuous reinforcement.There are also more *complicated* reinforcement schedules such as multiple, compound, and complex schedules that are various combinations of the basic four simple schedules and are way beyond the scope of this book. But don't worry, I don't think you'll run into those schedules in any behavior plans you happen to come across.

FIXED RATIO (FR)

The first is the *fixed ratio* schedule in which the individual is always reinforced for the same number of times the target behavior happens. For example, a sales person might receive a bonus commission for every fourth pair of shoes sold. In class, a child may receive one star for each ten correct answers. Workers paid on a piecework pay schedule are on a fixed ratio schedule, represented by the abbreviation FR followed by the number of behaviors needed for reinforcement. If the requirement is assembling five widgets, then the abbreviation for this reinforcement or payment schedule is FR 5. Although fixed

ratio schedules can be the simplest to use, we have to be careful that we don't sacrifice quality or accuracy for quantity or speed and end up with a lot of sloppy work.

VARIABLE RATIO (VR)

The second schedule is the *variable ratio* schedule. In the variable ratio schedule the number of responses required for reinforcement keeps changing, so that little Jane never knows when to expect reinforcement. She is always kept guessing. She might receive two or three reinforcements in a row and then have to give seven or eight responses before she gets her next reinforcement. Over time though there is an average of the number of responses needed for reinforcement. Once again, this can be represented by an abbreviation with the average number of behaviors used for reinforcement, such as VR 10. It is also the most powerful and effective of the basic reinforcement schedules. By that we mean fewer total reinforcements are necessary to keep the behaviors going and, as far as the basic schedules are concerned, behaviors maintained on a variable ratio schedule are the most difficult to extinguish. Not surprisingly, variable ratio is the schedule that the famous one-armed bandit slot machines in casinos appear to work on.

FIXED INTERVAL (FI)

The two schedules based on time are called *interval schedules*. In an interval schedule it does not matter how many times a behavior occurs, as long as it occurs at least once. What does matter is how much time has passed. If it takes ten minutes for a pot of water to boil, it doesn't matter how many times you check *before* that ten minutes are up. It's the first time *after* the ten minutes are up that you will be reinforced with boiling water. This would be a *fixed interval* schedule (FI 10, for ten minutes).

VARIABLE INTERVAL (VI)

There are also *variable interval* schedules. Have you ever tried to reach someone by phone but kept getting a busy signal? We keep picking up and dialing with no way of knowing when the line will be free.

It doesn't matter how many times we try. But that first successful attempt once the phone line is free gets reinforced. Since we don't know when we are going to get an answer and our attempts to complete calls may be successful sooner or later, our phone-calling behavior is reinforced on a variable interval (VI) schedule.

Sometimes we want to reinforce a continuous, ongoing behavior rather than individual responses. An example of continuous behavior could be reading in class. We don't want a lot of going off and on task; we want Dick to stick to it. In this case it would be better for us to use a *variable interval* reinforcement schedule. On a variable interval schedule, as with the variable ratio schedule, he never knows when the reinforcement is coming, only that he must be performing the behavior desired in order to be reinforced.

THINNING

The process by which we change schedules from continuous to partial is sometimes called *thinning*. Gradually, almost so that it isn't even noticed, the amount of desirable behavior required for reinforcement is increased, but at a rate slow enough so that the desirable behavior isn't extinguished due to lack of sufficient reinforcement.

The four basic intermittent reinforcement schedules are summarized as follows.

A. BASED ON THE NUMBER OF RESPONSES (BEHAVIORS)

1. Fixed ratio (FR)
    - Reinforcement is delivered for every X number of responses, with X remaining constant.
    - The person usually knows when the reinforcer will be delivered.
    - For example, piecework.
    - For example, a token contingent upon placing five pegs correctly in a board (FR 5).

2 Variable ratio (VR)

- Reinforcement delivered for every X number of responses with X varying.
- The person is kept guessing as to when the reinforcer will be delivered.
- Most efficient schedule (can usually get the most work for the smallest payoff).
- Toughest schedule with which to use extinction successfully.
- For example, one-armed bandit slot machine that is set to deliver one payoff on the average of ten attempts (VR 10).

B. BASED ON THE TIME ELAPSED SINCE THE LAST REINFORCED RESPONSE

1 Fixed interval (FI)

- Reinforcement delivered for first response after X time has elapsed, where X remains constant.
- The number of responses during X has absolutely no effect on the delivery of reinforcement.
- For example, checking to see the coffee is ready. (It doesn't matter how many times you check, the coffee won't be ready any sooner.)
- If you boil a three-minute egg, it will always take three minutes (FI 3).

2 Variable interval (VI)

- Reinforcement delivered for first response after X time has elapsed, where X varies.
- For example, trying to reach someone by telephone and the line is busy. (It doesn't matter how often you try and you can't know how soon the line will be free.)
- Even if you go fishing every Thursday you don't know ahead of time how long it will take to catch your first fish. If you keep a record of this all summer long, however, you might find the average time is 15 minutes (VI 15).

In the real world behaviors don't just get reinforced when we want them to or when we set out to reinforce them on purpose. Day in and day out reinforcement, punishment, and extinction are going on in unplanned, random, haphazard ways. In most of the examples we've talked about so far, the consequences that influence the behaviors they follow are related to those behaviors. But in the natural environment this certainly is not always the case.

ACCIDENTAL/INCIDENTAL REINFORCEMENT

Behaviors can be unintentionally or *accidentally reinforced* and strengthened when it is not our intention to do so. This can happen when reinforcers coincidentally occur after random behaviors often enough so that they start strengthening certain behaviors. This can even happen when what we really want to do is eliminate those very behaviors. For example, Dick may have learned that he can get out of a boring history lesson by throwing paper airplanes in class and getting sent to the principal's office by Ms. Johnson. Unfortunately for Ms. Johnson, she is between a rock and a hard place in this situation. While sending Dick to the principal's office removes the class disruption in the short run (negative reinforcement for her), it actually accidentally reinforces Dick's interruptive behavior in the long run (positive reinforcement for him), making him even more likely to disrupt the class during future history lessons.

An interesting potential problem that can result from accidental reinforcement is what we call *superstitious behavior.*

SUPERSTITIOUS BEHAVIOR

Superstitious behaviors are behaviors that we engage in to bring about certain consequences, but that really have no effect on those consequences at all. Somehow these behaviors have been accidentally reinforced enough so that we might think there is a connection. Get it?

Things that just coincidentally happen right after some other behavior can start to affect the behaviors they follow if they happen to follow those behaviors often enough. Perhaps one day a long time ago Dick was bitten on the head by a mosquito as he was warming up to play in a baseball game. Later, as he came up to bat for the first

time his head was itchy. So to scratch the itch Dick lifted his baseball hat and scratched his head. Then, on the first pitch, Dick got a nice hit to knock in a run for his team. But on his next turn at bat Dick's head wasn't itchy and he didn't scratch. Unfortunately, just by coincidence, Dick happened to strike out rather than getting another hit. When he came to bat the third time Dick noticed that his hat was making his head itchy again, so he lifted his hat and scratched his head again. Then Dick hit a home run! The next time up Dick's head wasn't itchy, but the game was tied, he was a bit nervous, and without thinking about it he scratched his head anyway, then got his third hit of the game while knocking in the winning run for his team. Dick had a great game that day, receiving a lot of positive reinforcement in the form of base hits and social approval from his teammates.

When the next game was played a few days later, Dick continued to lift his hat and scratch his head whenever he came up to bat, whether his head was itchy or not. He only got two hits in five times at bat for the game and his team lost. That might not have been enough hits to win the game, but it was enough positive reinforcement on a variable ratio schedule to keep Dick scratching his head. Over the course of his baseball career Dick has averaged about three hits for every ten times at bat (variable ratio), which is pretty good for a baseball player. But he also now has the habit of going through the superstitious ritual of lifting his hat and scratching his head every time he comes up to bat.

If you happen to be a baseball fan and from time to time you watch major league baseball, chances are you've noticed some of the best major league hitters going through their own superstitious routines when they come up to bat too! One of the best players on the Boston Red Sox once admitted that he had the superstition of talking to his bat before the game starts. I'll bet it would be quite interesting to try to figure out how that behavior evolved!

Superstitious behavior patterns appear to be mostly shaped and maintained by intermittent reinforcement. Perhaps you can think of some examples of superstitious behavior that you or people you know in your own life engage in.

CHAPTER 5

WHAT ARE SOME OTHER KINDS OF LEARNING?

MODELING

So far we have been talking about direct learning. But in addition to the operant learning that we've already talked about, there is another kind of learning that has an especially strong influence on children. This kind of learning is called *modeling*. Sometimes referred to as *imitative*, *vicarious*, *observational*, or *social learning*, modeling is the process through which an individual's behavior changes after observing someone else (called a model) perform the behavior, rather than by personally performing the behaviors and directly experiencing the consequences. Usually, the more the child admires the model or the more similar to the child the model appears, the more likely it is that the model's behavior will be imitated. For example, a number of children might start making noises in class after one child begins. Monkey see, monkey do. Or if an admired member of the class volunteers to help with a job, it will be easier to get others to do the same.

A teacher's demonstration of how to do something is a form of modeling. Modeling isn't limited to watching something happen and then copying what we just saw. Besides seeing people behave in real life and imitating them, watching real and fictional models on TV and in the movies, listening to CDs, radios, iPods, hearing a story with a moral to it, reading about characters in books, and other types of media are all ways that modeling can take place.

A considerable amount of research has been conducted and many books have been written about modeling by Albert Bandura and his associates (e.g. Bandura 1974). Although experts still disagree about just how learning takes place through modeling, for our practical purposes here modeling does work as a means to influence behavior, whether for better or worse. (If it didn't, why would so

much money be put into TV commercials with actors modeling, using, and purchasing various products and celebrities telling us to buy this and buy that?)

BEHAVIORAL REPERTOIRE

A *behavioral repertoire* includes the behaviors that someone has the ability to currently perform, right now, but most of which are not being presently performed. Reading sentences in English is part of your behavioral repertoire and that is what you are doing right now. Swimming may also be in your behavioral repertoire, but unless you're really talented, you're not swimming right now. Flying the space shuttle probably is not in your behavioral repertoire, and it is definitely not in my behavioral repertoire either.

It is important to make the distinction between the acquisition of behavior and the performance of behavior. Acquisition has to do with learning how to perform a behavior that you could not previously do. You may not be able to play a tuba. If you wanted to play a tuba you would have to go through a long learning process of acquiring quite a few tuba-playing behaviors. But just because the ability to play a tuba is then in your behavioral repertoire, it obviously doesn't mean that you're constantly playing the tuba. The right conditions have to be in place to *motivate* you to perform the behavior. We all have many behavioral patterns in our repertoires that we could perform if the conditions were right, but we don't perform them all the time. You may be able to drive a car, but it is hoped you're not doing that now at the same time you are trying to read this. Once a behavior is acquired, we need to establish a system to encourage or *occasion* and maintain the performance of that behavior under the proper circumstances.

Modeling is an important means of acquiring new behavior patterns and is effective in strengthening or weakening inhibitions; observing a model often serves as an S^D to perform previously learned behavior. Modeling is important in learning speech, athletic skills, social skills, and other complex behaviors. Live modeling is thought to be particularly powerful in institutional settings such as schools, prisons, and mental hospitals. Modeling helps teach the *know how* of a behavior, but doesn't necessarily mean that the behavior will

be performed by the observers, unless a contingency is involved, either observed or in real life for the new learner. The combination of modeling for teaching how to perform a new behavior, together with positive reinforcement for actually performing the behavior, is very powerful.

CLASSICAL CONDITIONING

By now some of you who may have taken a general psychology course somewhere along the way may be saying something like "I remember hearing about some Russian guy who did strange things to dogs. Where does all that come in?"

Well, since you asked, this is as good a place as any for it to come in. Let me try to refresh your memory. Does the name Pavlov ring a bell? Earlier we talked about B. F. Skinner as sort of being the father of a kind of learning usually called operant conditioning. In the same way Ivan Pavlov can be thought of as the father of another kind of learning usually called *classical conditioning*, but sometimes referred to as *respondent conditioning* or simply *Pavlovian conditioning*.

In his classic experiment Pavlov is said to have conditioned a dog to salivate at the sound of a bell. Before he started his experiment, the bell was quite neutral. In other words the bell had no effect on the dog, at least as far as salivation was concerned. Pavlov could ring the bell all he wanted. The dog might have done a lot of other things, but did not salivate. On the other hand Pavlov knew that if he put meat powder in the dog's mouth the dog certainly would start salivating. So Pavlov tried ringing the bell (which, in Pavlovian terminology, was called a neutral stimulus) followed immediately by putting the meat powder (called an unconditioned or unconditional stimulus) in the dog's mouth, which resulted in the unconditioned salivation. After doing this for a while Pavlov found that if he just rang the bell, even without the meat powder following it, the dog would still salivate, at least for a while. So after all this happens, the bell (formerly known as a neutral stimulus) gets its name changed to *conditioned* or *conditional* stimulus (depends on which translation of Pavlov you read). That is, it works as a stimulus to elicit, or bring about, salivation as long as, or under the condition that, every so often it is followed with our old reliable unconditioned meat

powder, to sort of recharge the connection. If we keep going on and on with just the bell and no meat powder, eventually we have a form of extinction take place and we are back where we started, with the bell ringing becoming pretty much a neutral stimulus again. All bell and no saliva.

Pavlov and his followers conducted many more experiments on dogs and other animals and discovered quite a bit about the process of learning. Others have taken these findings and have developed effective treatments for a variety of human behavior problems.

While classical conditioning certainly is important, perhaps the area of behavior modification where we see classical conditioning used the most is in the treatment of maladaptive emotional behaviors such as phobias. Many phobic and other emotional behavior problems have been shown to develop through classical conditioning and also to be effectively treated through behavior therapy techniques based on classical conditioning principles. But this is not generally thought of as a part of ABA and we won't go into all that now. If you are interested in reading more about this, many of the writings of Joseph Wolpe (e.g. Wolpe and Wolpe 1988) would be a good place to start.

RULE-GOVERNED BEHAVIOR

Sometimes you may hear the term *rule-governed behavior*.

Distinctions are made between *contingency-shaped behavior*, which we've already talked about a lot, and rule-governed behavior. I hope you remember that contingency-shaped behavior involves *real* consequences (reinforcers, punishers, etc.). Rule-governed behavior refers to situations in which some individuals respond well to verbal directions to do this or to do that, often with a consequence either clearly stated or implied, but that may not be actually experienced first hand. "Eat your vegetables and you'll grow up to be big and strong." "If you hit your sister again you can't watch TV tonight." "Don't touch that hot stove" ("or you'll burn yourself" as an unspoken implied consequence). "Do your homework" ("and someday you'll get a good job," again often implied as a long-delayed consequence). In these situations and others like them, the contingencies don't usually happen in the student's real life, but the student behaves pretty much

as if they did. Some people are much more responsive than others to rules. Although there certainly are exceptions, children with ASDs are thought to adhere more rigidly to learned rules than the general population. On the other hand people with ADHD are thought to be less influenced by rules, and more often have to learn things the hard way (that is, experience the consequences themselves, so we say more of their behavior is contingency shaped). If you like analogies, contingency shaped is to rule governed as experiencing something yourself is to being told about something. Since learning through rules and modeling both involve behavior changes without directly experiencing the behavioral consequences, some might say we are talking about different aspects of the same learning process.

In an ideal world rules tell us how to behave and contingencies give us incentives to behave that way. It often does happen that the rules and contingencies encourage the same behavior, but in real life after rules tell us to do one thing, contingencies sometimes shape us to do something else.

COVERT CONDITIONING

There is another kind of learning called *covert conditioning* which involves having the individual imagine the behavior to be influenced and then imagining an appropriate consequence to change that behavior. It is beyond the scope of this book to discuss covert conditioning here. There are some published reports that have found covert conditioning procedures to be helpful with some autistic students at The Groden Center in Providence, Rhode Island (e.g. Groden 1993), so it is possible that if you are reading this you have heard the term covert conditioning. There are a lot of similarities between covert conditioning, modeling, and rule-governed behavior.

Learning in real-life situations is usually more complicated than it appears in these simplified illustrations. Learning, unlearning, and relearning are constantly taking place. Everything we do in the presence of others can have some effect on their behavior. But the processes through which learning occurs are the same for everyone, and techniques based on these principles can be adjusted to fit any situation.

PART 2

PUTTING IT ALL TOGETHER

CHAPTER 6

WHAT IS A BEHAVIOR ANALYSIS?

TEN STEPS TO BRING IT ALL TOGETHER

One of the greatest advantages of using a behavioral approach to helping with human problems is that it includes methods for objectively evaluating the procedures used to treat the problems. We can then make our treatment decisions based on scientific methods of assessment that use objective evidence and actual data rather than just relying on subjective opinions and wishful thinking. With this approach the treatments can be continued, adjusted, or discontinued and replaced based on the evidence of objective data.

When someone does something unusual, it is not at all unusual to have someone else ask, "What makes someone do something like that?"—especially if the person asking happens to know that you are a psychologist. It seems like a natural question to ask, but the truth is that there is no one answer to that question that fits all cases. The same behaviors may be performed by different people for different reasons, different behaviors may be performed by different people for the same reasons, and the same person may perform the same behavior at different times for different reasons. Pretty confusing, isn't it?

So what can we do to try to understand what's really going on and what can be done about it? In treating a problem from a behavioral point of view, the first thing to do is what is commonly called a *behavior analysis*. This is simply a method of sizing up the problem situation and planning what to do about it.

The terms *functional analysis* and *functional behavioral assessment* are often used in talking about ways of looking at and sizing up behavior problems. They have to do with identifying the variables of which behavior is a function, whatever that means. The key word in these and similar terms is *functional*. What we are trying to figure out here is what function, or purpose, the behavior serves. What does it accomplish? How does it pay off? How does the behavior operate to

increase the child's general level of reinforcement? Does the behavior function to avoid or escape from something aversive, or does the behavior result in positive reinforcement of some sort? If our goal is to replace a maladaptive behavior with more adaptive behavior, it is not as important to figure out what made the troublesome behavior happen in the first place (which could have been years ago) as it is to figure out what's keeping the behavior going now ("What's in it for Jane?"). What function does the behavior serve now? For example, it is common to see children with communication deficits learn that physically intrusive behaviors of some sort or another can function to get the attention of others.

FUNCTIONAL ANALYSIS

Functional analysis refers to a more science-based approach that involves keeping most factors or variables unchanged (or constant) while intentionally changing other factors (As and Cs) that might influence the target behavior (B). By keeping track of what changes, if any, do occur in the target behavior we can come to a more objective understanding of how certain behaviors may or may not be influenced by changes in the environment.

FUNCTIONAL BEHAVIORAL ASSESSMENT (FBA)

Functional behavioral assessment (*FBA*) is generally a broader term in that a functional behavioral assessment may include a functional analysis, but also includes other types of information gathering such as reviewing existing records and interviewing adults who know the child well. The goal is still to achieve an understanding of the relationship between the child's behavior and various factors that may influence the behavior.

There are a number of approaches to behavioral assessment that are useful for sizing up problems, planning what to do, and evaluating the plan's effectiveness. Information for assessments is commonly gathered by using a variety of methods including direct observation and obtaining dependable information from individuals who know the child well, and occasionally from direct interviews with the child. Assessment may include the use of assessment forms and behavior rating scales completed by the parents and teachers. Often the decisions about what behaviors to target are made after

talking with parents and teachers, followed by informal observations to confirm or refine first impressions. Direct observations by trained observers, who know what to look for and how best to record what they observe, are usually the major component of a good behavioral assessment.

As I mentioned earlier, while most initial referrals don't provide sufficient information to develop a behavior treatment plan, they should at least be helpful to give us some pretty good ideas of where to start. By talking with the individual making the referral, the parents, the teachers, and others who have day-in and day-out ongoing knowledge of the child, we can usually get a better idea of what the problem behaviors are. Asking the caregivers to complete more lengthy structured questionnaires about the child's behavior can help guide informants toward giving us more useful information. This process can also help them to learn to think of these things from a more behavioral perspective, sort of like learning to see things from someone else's point of view or to think in a second language besides English.

An old but still useful technique for getting a quick idea of what is going on during a classroom observation is based on our ABCs. Since observers tend to take notes of whatever they see happening anyway, it can be helpful to make three columns on a sheet of paper, with headings A (for antecedents), B (for behaviors), and C (for consequences). As the observer writes a running narrative of what is happening across the page, the events can be almost automatically sorted into the As, Bs, and Cs.

Time	A	B	C
9:46	Teacher turns her back to the class	Dick throws a paper airplane	Class laughs
9:47	Teacher turns around	Dick resumes copying from blackboard	——

This method has been a great help in bridging the gap between referral reasons that are too subjective or incomplete to be all that useful and more detailed and specific data-gathering observational techniques.

There are numerous systems for conducting a behavior analysis. The ten-step method presented here is based on the system previously

recommended by Cautela and Kearney (1986, 1990) as a means of analyzing and treating problems from a behavioral perspective.

STEP 1. OPERATIONALIZE THE TARGET BEHAVIOR

The first step is to operationalize the problem. That means spell it out. Saying Dick is aggressive or Jane has a poor self-image doesn't tell us anything very useful. Why do we say Dick is aggressive? Maybe it's because he throws things at his teacher. Well, then, that's what we are interested in—Dick's *throwing* behavior. The behaviors to be modified should be specified or *operationalized* as objectively as possible. Saying that Dick is disruptive in class doesn't tell us very much. Saying Dick hits the girl who sits in front of him over the head with a book every time she turns around tells us a lot more.

A common reason for referral is childhood aggression. But what does that mean, and how do we get to a referral for aggression? Well, first Dick usually does something that someone in authority doesn't like. Or maybe Jane doesn't do something and the person in authority doesn't like that either. That might be called passive aggression.

Anyway, suppose, for example, Dick draws a lot of pictures of weapons dripping blood and dismembered bodies in class. Or Jane tells a classmate that she will "get her" for playing with someone else at recess. Or a third student stays seated in his chair but growls when others approach him closely. Rather than just repeating the specific objective behaviors of concern, many adults might interpret these events as *aggression*, and simply report the child as being aggressive, perhaps thinking that they have performed a clear and helpful service by taking their objective observations to another level, a level of interpretation and assigning a presumed cause of the behavior. (Sometimes we are better off asking Dick's classmates what he does that bothers people. We are usually more likely to get a straight answer from children about many of these things.)

So now we have Dr. Lynch, the psychologist, reviewing the referral, reading that Dick is aggressive. But Dr. Lynch never saw Dick in action and at this point has no other source of information or context to use to help interpret this information. Because of her own previous experiences and expectations of the term *aggressive*,

Dr. Lynch has thoughts and memories of other students physically beating other children and makes the (false) assumption that Dick is behaving the same way. So by going from an objective observation to a subjective label, then back to another presumed objective view about what a student is up to, we have seriously miscommunicated the truth of the matter and thereby set the stage for all sorts of additional problems. It would have been much easier in the first place just to keep matters at the objective observation level. Things got all mixed up once they got to that subjective hypothetical construct label level.

Take a great work of English literature, say one of Shakespeare's poems. Translate that into a foreign language, even a relatively well-known language like French. Then have someone else who never read the poem translate it from French back into English. How much like the original poem is this second-order translation likely to be? Do you think you'd get the message Shakespeare originally intended to communicate? I suspect old Bill would be turning over in his grave if he ever saw what we ended up with.

Another common referral reason, poor self-image or low self-esteem, also isn't very useful and doesn't tell us that much either. What does Jane do or not do that gets us to say that she has a poor self-image? Does she make a lot of comments in which she seems to be always finding fault with herself (sometimes called negative scanning)? Does she act passively when classmates try to take advantage of her? That's what we need to know and what we need to work on changing.

When identifying appropriate target behaviors, the attempted treatment of behavior problems is too often focused only on the elimination of the problem behavior(s).

REPLACEMENT BEHAVIOR

If someone has a habit that we want to change we really should try to find an appropriate, successful, and socially acceptable behavior to replace that problem behavior. This new behavior that we want to replace the old behavior is called the *replacement behavior*. Generally, we should select replacement behaviors that serve the same purpose (have similar effects) as the maladaptive behaviors but are easier to perform, work better and are socially useful and acceptable.

RELEVANCE-OF-BEHAVIOR RULE

Sometimes it can be hard to decide which behaviors are worth trying to change. When they were working with token economies in the 1960s, Ted Ayllon and Nate Azrin came up with a useful guideline to help make these decisions. This guideline, which is called the *relevance-of-behavior rule*, says that we'll probably all be better off in the long run if we put our time and effort into trying to change behaviors that are likely to be useful and get enough reinforcement back in the natural environment so that naturally occurring reinforcement keeps these new behaviors going on their own. What's the point in putting in all that time and effort to teach Dick some behaviors that won't be useful to him when he returns to the real world and will probably quickly extinguish? That would sort of be like teaching Dick to speak Swedish, then sending him off to live in Guatemala. One helpful question to ask when selecting target behaviors is, "How would Jane's life be different if this behavior changed?"

Once we've decided what Dick should be doing, it is important to figure out whether or not Dick can already perform that behavior. Are we dealing with an acquisition problem or a performance problem? In other words does Dick need to learn or acquire behaviors that are totally new to him, perhaps making his own lunch? Or rather than acquiring new behaviors, does Dick need to start performing already acquired behaviors more consistently or in new situations, perhaps blowing his nose on a tissue rather than on his shirtsleeve? Whether we are dealing with an acquisition or performance problem can make a big difference in the type of intervention program we design.

BEHAVIORAL OBJECTIVE

Many behavioral treatment plans are based on the use of *behavioral objectives* to set goals to guide our interventions and to evaluate how well the interventions are working. Some experts have described behavioral objectives as a specification of learning in terms of observable, measurable behavior. More simply, behavioral objectives are a statement of the behaviors that we want Jane to perform. What are our objectives in terms of the behavioral changes we want Jane to

achieve? Good behavioral objectives usually have five components to them:

1. who (will perform the behavior)
2. the behavior (what Dick will actually do)
3. the result (the product or performance)
4. the conditions (e.g. in the dining hall, given a list of 20 words, etc.)
5. the criteria (e.g. four out of five times, 90% accuracy).

An example might be something like "Dick will correctly spell nine out of ten words taken from Chapter 6 of the fourth-grade spelling book."

STEP 2. FIND THE BASELINE

BASELINE

The second step is to get a *baseline*, which means finding out how often the child performs the target behavior under typical circumstances. This is usually done by having an observer sit in a classroom for a week or so watching Dick and his interaction with the environment and counting the behaviors of interest. Teachers can sometimes collect baseline data themselves, as can aides or even students in the class.

The purpose of a baseline is to assist us in monitoring the target behavior. Once we have a baseline we should then be able to tell rather quickly if our treatment is making things better, worse, or not having any effect at all simply by checking to see if there is a decrease, increase, or no change in the frequency of the target behavior. Remember back in Chapter 2 we talked about the importance of frequency and rates of behavior? These numbers we come up with are referred to as *data*, and they are extremely useful in making decisions based more on factual evidence than on subjective opinions. It is typical to gather baseline data for a week or two before beginning an intervention. This allows us to get a more representative and stable sample of the target behavior without treatment, so that once we try to do something to improve the behavior we can make a more informed data-based decision

about whether what we're trying is really helping or not. This also enables us to make future adjustments to the program based on real evidence.

It is common for the first few days of collecting baseline information to be a bit abnormal simply because of the presence of another adult in the classroom, which can be a big change to the environment. If a new person comes into the classroom to do the observing, that person should not get involved in classroom activities and should try to minimize interacting with the children. Essentially the observer should, as much as reasonably possible, try to hide in a corner with a good view. This is to have as little effect as possible on the classroom environment and the target behaviors. It's a good idea to explain this to the teacher or other adults in charge before going into a class or other setting to make behavioral observations.

Once treatment begins, the same methods that were used for gathering data during the pretreatment baseline period are usually continued to aid in monitoring progress and evaluating the effectiveness of the treatment we are using. Even when treatment is complete, occasional follow-up data gathering can be helpful in some cases to watch for signs of relapse.

When gathering baseline data we usually don't have to be constantly watching and counting all behaviors that occur. We are essentially collecting a sample of behavior, in much the same way that opinion pollsters might ask a sample of voters which candidate they favor in the next election. When the sampling is done properly, we can usually get a good idea of what the big picture looks like. In dealing with many school-based behavior problems, samples of 30–60 minutes of the school day can be effective, but we often would need to vary the time from day to day to get a representation of the whole picture.

EVENT SAMPLING

There are two general types of behavior sampling that are commonly used. The first, which is called *event sampling*, is a count of the frequency or the number of occurrences of the target behavior within a set period of time. That is, how many times does the behavior happen every minute, every ten minutes, every hour, or whatever? Event sampling is useful in counting discrete behaviors with clear

beginnings and endings (e.g. the number of times Dick gets up to sharpen his pencil or the number of animals Jane can name in 15 seconds) and is usually recorded by some type of tally count (e.g. 𝍸, //). Sometimes the amount of time it takes to do something is counted using event sampling: for example, the amount of time it takes Jane to run around the track in gym class or the total amount of time that Dick is in (or out) of his chair during silent reading.

TIME SAMPLING

The second type of sampling is called *time sampling.* Time sampling has to do with whether or not a behavior is present or absent at certain points in time and is useful with behaviors that are not so discrete and are more continuous or difficult to count. Making nonsensical vocal noises or talking with a classmate would be examples of behaviors that probably would be counted by time sampling, since it would be difficult to decide when one instance of a behavior ends and the next one begins. In time sampling, a short uniform time interval unit is selected, perhaps in the range of 10–30 seconds. If the behavior occurs at all during that period, whether just for one second or for all 30 seconds, it is recorded as present. A useful rule of thumb is that if a behavior occurs less than once per 15-minute time period, we should try to find a way to use event sampling.

DURATION

Once a behavior or a pattern or sequence of behaviors gets started, the length of time the behavior goes on is called the *duration* of the behavior. Changes in duration are one of the ways we can spot improvement in behavior. If Jane is still having about five tantrums a day, but now the typical duration of her tantrums is four minutes instead of the previous ten minutes, that's improvement.

Although there are many different recording systems that can be used, it is often most useful to develop an individualized system for the unique situation. Teachers and parents may use wrist counters like those worn by golfers or use bead counters they can wear on their belts, whereas other observers may have a recording sheet with a shorthand code to enter appropriate symbols (e.g. O = no problem, S = out of seat, H = hitting, Y = yelling, etc.).

The data collected through these observations are usually presented by some sort of visual display, such as graph paper, to enable a quick check as to how the rate of behavior is changing over time. In some programs you might see a funny-looking kind of graph paper sometimes called a *standard celeration chart*, which is used in a very specialized and effective approach to teaching known as *precision teaching*, which we'll talk more about later. While these charts can be very helpful when you know how to use and read them, it does take some specialized training, but even elementary-age school children can learn to use these charts to keep track of their own behavior.

STEP 3. IDENTIFY THE ANTECEDENTS

The next step is to try to pin down the antecedents of the target behavior. Is there anything that consistently happens right before the target behavior occurs? For example, maybe his teacher always turns her back to the class to write on the blackboard just before Dick throws something at her. Identifying antecedents has to do with those S^Ds and MOs we talked about way back in Chapter 3. Remember them?

LATENCY

In trying to identify the antecedents of a behavior or a sequence of behaviors, we should keep in mind the notion of *latency*. Latency refers to the length of time between the antecedent and the behavior. If the teacher tells Dick to put away his crayons and take out his reading book, the time it takes him to get started is the latency. In many instances the latency is very brief, but the delay can be more noticeable. Finding the antecedents of a behavior is usually relatively difficult and, although quite helpful, not always absolutely necessary.

It is also important to know where and when the target behavior occurs most often and least often. These can be thought of as special kinds of antecedents.

STEP 4. NOTE THE PLACE

Where does the target behavior occur? What is the most common location for the behavior? Perhaps at school but rarely at home.

Perhaps during silent reading but not during music. Perhaps in the lunch room and out at recess but never in the classroom. By identifying specific locations we can often get clues to the S^Ds that have strong effects on target behaviors.

Perhaps the events going on in those locations are what is important. Perhaps it is something about the physical characteristics such as color, lighting, noise, temperature, or objects or persons in the room that has the greatest influence on behavior.

It is also important to find out where the behavior does not occur, or occurs at a relatively low rate. Useful clues may be found that suggest changes that can be brought into the high frequency setting to help reduce the frequency of the target behavior. On the other hand we might be doing a behavior analysis of a behavior we want to strengthen or increase. Then of course we use this information to arrange the environment to make Dick more likely to engage in the target behavior.

STEP 5. NOTE THE TIME

Time is important primarily because knowing the time can give us clues to what might routinely be going on at the time the target behavior occurs. Is it just before lunch and Jane is hungry? Is it early in the day and certain medications may have just been taken?

As with location, or *where*, time has to do with the *when* question and is helpful for finding out what is or is not going on at high and low frequency times. But we shouldn't limit our investigations to what is going on in the external environment. To paraphrase Skinner, the environment doesn't end at the skin, so what's happening inside our bodies is also important to consider. Perhaps it's 11:30 and Dick is very hungry. As we've all experienced first hand, hunger can influence behavior.

Perhaps a medication has worn off, or perhaps it's 14:00 and Jane is quite fatigued after a long day at school, or it's 22:00 and she hasn't gotten to bed yet.

SCATTER PLOT

We recently looked at using tally marks as a way of keeping count of the frequency of a target behavior. An even better way in many

cases is to use some variation of what is called a *scatter plot.* A scatter plot is a frequency recording method that helps determine when the target behavior happens most and happens least. This could be as simple as using a piece of paper with time periods written in the left margin. We would then just tally the target behaviors in the space next to the appropriate time period.

Suppose we're trying to keep track of how often Dick touches his classmates. Part of a simple scatter plot might look like this:

10:00–10:15 //

10:16–10:30 /

10:31–10:45 𝍸 ///

10:46–11:00 //

From this data we know that Dick touched classmates 13 times during this hour. But we can also see that eight of the touches, more than half, were in the 10:31–10:45 time period. When we check Dick's schedule we see that this was the time of morning recess break. This tells us that some potentially important factors changed in Dick's environment, including Dick's location (or place), the activity, and the adult supervision. These are all useful bits of information to consider as we continue on with our behavior analysis.

To organize this data many people find it helpful to use graph paper or to design forms to record the data in various grids on the paper. The actual design of these forms can be quite different, depending on the needs of the unique situation.

STEP 6. IDENTIFY THE CONSEQUENCES

Even more important than the antecedents are the consequences of the behavior, especially what happens immediately after the behavior.

Maybe after Dick throws an object in class the teacher turns red and screams at the class, which Dick thinks is a really funny sight.

So now we have a lot more useful information about what is going on than simply being told that Dick is aggressive. We know that every time the teacher turns her back to write on the board,

Dick throws something at her and she turns red and screams at the class. Now this is much more helpful than hearing someone just labeling Dick as an aggressive child. This series of antecedents, behaviors, and consequences is what we go to work on, not the label "aggressive."

It is important to remember that in real-life situations the reinforcers that shape, strengthen, and maintain target behaviors rarely occur after every instance of that behavior. Remember earlier we talked about intermittent reinforcement schedules? These are extremely common in real life, so we usually need to observe several instances of a behavior to get a good idea about what reinforcers are involved.

There is an often-quoted line from an old movie: "Follow the money." A good paraphrasing of that line to guide us in trying to understand behavior is: "Follow the reinforcers." A widely used tool that can be helpful in identifying reinforcers is…

MOTIVATIONAL ASSESSMENT SCALE (MAS)

The *Motivational Assessment Scale*, or MAS, was developed by Mark Durand and Daniel Crimmins. It is a questionnaire used to gather helpful information when doing a behavior analysis or FBA. The MAS is designed to be completed by people who know the child well, such as parents and teachers. Based on the answers to its 16 questions, the MAS can give us a pretty good idea of whether the target behavior is reinforced by attention, tangible reinforcers, escape/avoidance, or sensory stimulation. Once we figure out the type of reinforcement Dick is receiving it can be a lot easier to come up with a program individually designed just for Dick to help him change his behavior.

STEP 7. IDENTIFY POSITIVE REINFORCERS AND AVERSIVE STIMULI

The next step is to determine what is reinforcing and what is aversive to Dick so that this can be taken into account in planning whatever programs we develop. There are a number of ways in which this can be done. The simplest of course is just to ask Dick what he likes and doesn't like. There is a form called the *Reinforcement Survey Schedule*,

which is very useful with high school age students and adults for this purpose. There are also *Children's Reinforcement Survey Schedules* for elementary school age children. These and many other useful forms for working with children can be found in a book called *Forms for Behavior Analysis with Children* by Cautela, Cautela and Esonis (1983). We can also ask Dick's caretakers and others who know him well for ideas. There are reinforcement survey schedules for parents to fill out, too, about their children's likes and dislikes. Just to be clear, we are of course looking for any positive reinforcers that may be influencing behaviors that are already occurring (Step 6). But in Step 7 we are also looking for other potential reinforcers that we might be able to use to strengthen appropriate behaviors that we want Dick to perform.

PREMACK PRINCIPLE

Another way of determining reinforcers is simply to observe Dick to see what kinds of things he chooses to do in a free choice situation when given a choice of a variety of possibilities. In other words, in determining reinforcers, whichever of two things an individual does more often when given a choice can often be used as a reinforcer for the other. Actually, as a general rule of thumb, the opportunity to perform behaviors that one ordinarily engages in quite a bit will usually function or work as a reinforcer for a less frequent behavior. For example, if the only way a chain smoker who didn't like working on his income taxes could smoke was to work on the taxes for a while, pretty soon the taxes would be finished. Or how about what is sometimes called *Grandma's Law*? Grandma may tell Jane, "You don't get your apple pie until you eat your vegetables." Using higher probability behaviors to reinforce lower probability behaviors is called the *Premack Principle.* Left to herself Jane would talk to her friends on the telephone rather than do her homework. So the privilege of using the telephone could be made contingent or dependent upon doing X amount of homework first. When done carefully, access to things and activities with which a child has a seemingly excessive interest or fascination can be used to reinforce other behavior.

GENERAL LEVEL OF REINFORCEMENT (GLR)

In general, a reinforcer is likely to be more powerful if someone has not been receiving much reinforcement of any sort lately. On the other hand if the individual has been receiving a lot of reinforcement, a given reinforcer is likely to be less powerful. This overall state of reinforcement is sometimes referred to as the *general level of reinforcement.*

Remember, reinforcers can come in the form of something tangible like a goodie to eat, or something intangible like a smile from someone we like. But the same things are not reinforcing for everybody and something that is a reinforcer for someone at one time in one situation may not be reinforcing at a different time or in a different situation. Even if you love chicken salad sandwiches, how hard would you work for one right after eating Thanksgiving dinner?

Of course these methods can be helpful to get ideas of where to start in identifying reinforcers. But the only way to know for sure is to be experimental, try the likely reinforcers out, and see what happens to the behavior.

REINFORCEMENT SAMPLING

Sometimes a procedure called *reinforcement sampling* is used to introduce potential new reinforcers. Various possible reinforcers are offered noncontingently, that is, with no strings attached. In other words we don't have to do anything special to get them; they are free (at first). We've all been offered free samples of new food products in supermarkets and we've received free samples of new products in the mail to get us to try a new product and perhaps buy more of the product later. This is a form of reinforcement sampling, same idea.

Variations of many of the methods used for identifying positive reinforcers can also be used to identify aversive stimuli. Since we want to emphasize the positive, however, we won't be going into that right now.

In thinking about reinforcers don't forget that a particularly important kind of reinforcement that we mentioned in Chapter 4 is *social reinforcement*, which comes in the form of attention from others. Human beings are social beings and attention can be a very powerful reinforcer. The more important the person giving the

attention is to the person receiving the reinforcer, the more powerful the attention usually is. Attention can come in many forms: a smile, a word, a physical touch, a meeting of the eyes. For some individuals with unusual backgrounds, even a scolding, a punch, or a kick can be reinforcing. Sadly, for many individuals with ASDs, social reinforcement is not as effective as it is with most people.

STEP 8. PLAN AND IMPLEMENT THE PROGRAM

We're now at the point in our behavior analysis where we've got to decide what to do about the target behavior. We must develop a program and give it a try. We look over the information we've gathered so far. We use our operationalized behaviors to specify behavioral objectives as goals to work on. The easiest solution in the case of Dick's throwing objects in class of course would be to eliminate the S^D, the discriminative stimulus, which in this hypothetical case was the teacher turning her back to write on the board, but this is not always possible. While stimulus control procedures can be very helpful, the meat and potatoes of most ABA programs will probably involve some combination of a way to reinforce the behaviors we want to increase while using extinction to weaken undesirable behaviors.

STEP 9. MONITOR THE PROGRAM

Once a program is designed for the unique child in his or her unique situation the plan is put into operation, but that is not the end of it. We have to keep a close watch on what happens next. We continue to observe and record data so that we have an ongoing record of what is happening, to help us to better understand any changes since baseline.

You've probably noticed by now that in ABA we talk a lot about collecting data. Ideally we collect data before we begin a behavior program to see what the current situation is without our help. Then we collect data as we go along to see if we are making progress with our intervention, and we even periodically collect data after we are finished to be sure the new behavior is continuing on its own.

PROBE

Besides just observing and counting what's going on, it can be helpful periodically to set up little tests or mini experiments, commonly referred to as conducting a *probe*, to test the effect of an intervention and to be sure we are headed in the right direction.

Sometimes after a treatment has been in place for a period of time, even if there is an encouraging change in the target behavior and the treatment appears to be helping, the intervention is intentionally discontinued for a limited period of time. This temporarily returns the situation to the original baseline conditions. If the target behavior returns to baseline levels, this is considered to be evidence that the treatment intervention was in fact responsible for the improved behavior and the intervention is reinstated. This whole process is sometimes referred to as an A–B–A–B *reversal design*, with A representing the pretreatment baseline conditions and B representing the addition of a particular treatment. So A–B–A–B represents baseline–treatment–baseline (again)–treatment (again).

Another common way to monitor an intervention plan is by using what is called a *multiple baseline* approach. In multiple baseline the treatment stays in place once it is implemented (assuming an acceptable behavior change occurs), but the treatment is expanded in sequential steps as it is applied to address additional behaviors one at a time. Multiple baseline is particularly useful when it is difficult or highly undesirable to reverse the behaviors, or it is not practical to reverse treatment to allow a problem behavior to temporarily return.

INTEGRITY CHECK

This is another one of those terms that means pretty much what it sounds like. An *integrity check* is taking a look to see if there is any meaningful difference between the way we are told things are and the way things really are. One situation in which this comes up is when we have an observer collecting data, such as keeping track of how many times Jane turns around to talk to Sally during class. Sometimes we may want to have a second observer keep track of the same behavior. We can then see how close the reports of the two observers are to each other, then calculate a nice little statistic to indicate the degree of this observer agreement, or as it is called technically, the *interobserver reliability*. While this is a nice check on

the reliability of the data we have, in reality this type of integrity check probably happens more often during research studies than in day-to-day practice.

A second type of integrity check that is usually of greater interest to parents, advocates, consultants, supervisors, and the like has to do with taking a look to see if the behavior intervention plan (or an Individualized Educational Plan (IEP)) is being regularly followed as it is written and is expected to be implemented. If not, why not? There may be good reasons if it isn't. There are certainly a lot of inappropriate plans out there. But it would be nice if what was really going on and what people thought was going on were pretty much the same thing. Just because there are a couple of pieces of paper in a child's file—an IEP, a behavior plan, a 504 plan, or something else—this is no guarantee that what it says on those papers is what is really happening.

STEP 10. EVALUATE AND ADJUST THE PROGRAM

As we monitor the program and continue to gather ongoing data we need to make a judgment about the changes, if any, that are taking place in Dick's behavior. If the program isn't working, then we have to adjust the program until it does. This may require going over some of the earlier steps again. This is where accountability comes in. We don't want to waste everyone's time and efforts doing things that aren't helping. By examining and analyzing what's going on by using scientific evidence-based methods, we can better find what is and isn't working, and then make better decisions for changes based on science rather than on hunches. An ABA approach allows for trials of numerous interventions, but evaluates them all fairly, impartially, and scientifically. It certainly is not a one-size-fits-all approach as is sometimes seen with some other approaches.

When evaluating behavior change programs we should not expect overnight miracles. Bad habits usually don't develop overnight and neither do good habits. Like many bad habits, many of the maladaptive behaviors that we are trying to change have had months if not years of reinforcement, and it is reasonable to expect that it will take some length of time to bring about satisfactory changes. We should, however, watch for and be encouraged by trends and

improvements in the wanted direction, and take this as evidence that we are on the right track and be patient.

Changes in patterns of behavior rarely take place right away and these changes usually do not take place smoothly. If Dick never used to finish his class reading assignment and now is finishing it two days each week, that is probably an encouraging improvement. It's not where we want to end up, but we're clearly moving in the right direction. Along the way Dick is likely to take a few steps backwards. After getting up to three days per week he might temporarily slip back to two days before progressing on to four days. When these slip-backs occur, this is not a reason to be surprised and is certainly not a reason to immediately throw out the program. Be patient, give it a bit more time, and see what happens. Maybe minor adjustments, if anything, are all that are needed to get the ball rolling again.

A student once came up with the following sentence to help remember these ten steps of a behavior analysis:

Our	Operationalize (the target behavior)
Behavior	Baseline
Analysts	Antecedents
Place	Place
The	Time
Child	Consequences
In	Identify (positive reinforcers and aversive stimuli)
Prudently	Plan (and implement a program)
Monitored	Monitor (the program)
Environments	Evaluate (and adjust the program)

Maybe it will help you remember these steps too!

When we began this chapter someone had said that Dick was being aggressive. But throughout this whole process the label *aggressive* hasn't been useful to us at all. This is one of the reasons why we don't use labels such as neurotic, psychotic, or emotionally disturbed. People don't fit smoothly into any of these categories and, even if they did, it wouldn't make any difference in how we

try to help them, so labels are not particularly useful (but sometimes are needed for bureaucratic purposes). A formal medical diagnosis can of course be useful in treating medical conditions and when medications may be prescribed, but are generally less useful when we're using educational and other environmental treatments to improve behavior. Then it's much more helpful to know the As, Bs, and Cs of the target behaviors.

I certainly wouldn't expect most parents and teachers to be gathering all this information and conducting a behavior analysis on their own. But now you know some of the important questions you may be asked to help answer, and why.

CHAPTER 7

WHAT DO WE DO NEXT?

So far we have been talking mostly about general laws and principles and a general method for applying them. Now we need to talk about specific applications of these behavioral laws and principles. In other words, we need to talk about what we actually can go out and do if we want to change the way someone behaves.

As we begin, an important point to remember is that whether we are using reinforcers to strengthen behavior, or aversive consequences to weaken behavior, it is important that these consequences immediately follow the target behavior, or we risk reinforcing or punishing the wrong behavior. Also, keep in mind that these basic learning operations are often used in combinations with each other to help learning take place more effectively.

If you're trying to come up with a behavioral plan that depends on someone else actually putting the plan into action, an important rule of thumb to use is to keep the plan as simple and manageable as reasonably possible. What may seem like a magnificent plan on paper can easily turn out to be a big flop. If the people on the front lines who are expected to carry out the plan aren't properly motivated and trained to implement the plan, we've got trouble. If the plan is seen as just more work for already overworked teachers and staff, you've got trouble. Even if the staff members are willing to give the plan a try, they must be trained to do what is asked of them. Remember, in most cases telling them what to do (even giving them a written copy of a plan) and teaching them what to do are not the same things.

Now here are some of the more common applications of behavior analysis that you are likely to encounter in the world of ABA.

SHAPING

When we want to strengthen a new behavior, we often don't have the time to wait for it to occur on its own so we can reinforce it. Most goal

or target behaviors occur rarely, if at all, if they are not reinforced in some way. They may not yet be in the child's behavioral repertoire. In some cases we would be waiting forever for the behaviors to occur. If we are trying to teach Jane to swim, it's not very likely that some fine day she's just going to jump in the water and start right off doing the crawl stroke for the first time, giving us the chance to reinforce her swimming. So it is often necessary to *shape* the desired behavior. By *shaping* we mean reinforcing successive approximations of the desired behavior as the behaviors become more and more like the target behavior that we want to end up with.

Shaping is essentially using a combination of positive reinforcement and extinction: positive reinforcement to strengthen the behavior in the intended direction, while extinguishing behavior in the unwanted or no longer wanted direction. We keep replacing behavior that we recently reinforced with new, improved, closer-to-the-goal behavior. For example, if we want Dick, who seems to be always running around, to sit in his seat, we might have to begin by reinforcing him for coming closer and closer to his seat, eventually touching the seat, until finally we have him sitting down. It is important to remember not to reinforce him for any behavior further from the desired behavior than has already been reinforced. Also, he should only be reinforced for closer approximations of the desired behavior and usually not for the same behavior twice, until we reach the behavior we want. For example, if we have already reinforced Dick for being three feet from his desk, we should not reinforce him for being four feet away or even for staying at three feet. We should wait until he approaches closer than three feet and then reinforce him immediately.

Sometimes people are hesitant to act when a wanted behavior finally shows up. They may be worried about messing things up and upsetting the balance. They think they should hold their breaths and let sleeping dogs lie, and just hope for the best. But this is really the golden opportunity to *catch them being good.*

If we think about it, the Hot and Cold game that we sometimes play with children is actually based on a form of shaping. When we tell Jane that she is getting warmer when she gets closer to a hidden prize we are using positive reinforcement to shape her closer and closer to the target. Or think of a sculptor chiseling a block

of marble closer and closer to a statue of Abraham Lincoln. The sculptor's sculpting is reinforced as the marble begins to look more and more like old Abe.

Another way in which shaping could be used is in teaching Jane to read on the fourth-grade level. Jane must begin by learning the alphabet, various words, reading on a first-grade level, and so on up each step, getting closer and closer to the final goal. But Jane should be reinforced as she takes each successively closer step. Algebra is similarly learned through a series of steps over several years: first learning the names of the numbers and then counting, later simple arithmetic, and eventually algebra. Social behavior, such as cooperative play, might be shaped by reinforcing children first for playing in closer proximity to each other, next for talking to each other, and then for engaging in increasingly involved interactive play.

In using shaping we often vary the size of the step needed for reinforcement. Our goal, however, is to keep things moving in the right direction as we selectively reinforce behaviors that more and more closely resemble the target behavior.

RESPONSE DIFFERENTIATION

Related to shaping is a procedure referred to as *response differentiation.* Sometimes a behavior does occur from time to time, but not usually in a form that is up to acceptable standards. With response differentiation only those instances of the behavior that do meet acceptable standards are reinforced. For example, these differences in behavior could have to do with various qualities of the behaviors such as strength and duration, or they might have to do with the rate or speed at which the behavior is performed. This helps the student to learn to discriminate what forms or standards of behavior are acceptable and what are not. A teacher might use response differentiation to help a student learn to use legible penmanship more consistently, or a speech therapist might use response differentiation to teach a student to consistently speak more clearly. Performances of behaviors that acceptably resemble the goals are reinforced while sloppy attempts are extinguished.

BEHAVIORAL DRIFT

Understanding shaping and response differentiation should make it easier to understand *behavioral drift*. We don't always perform behaviors the same way each and every time we do them. After all, we're not robots, are we? Whether it's taking a foul shot in basketball, playing a song on a piano, or greeting an acquaintance we have just run into, there are often small, and sometimes larger and more noticeable, differences in our behavior. We might have a typical or *average* way of doing something, but once in a while we do it a little better and other times we do it a little worse, more this way or more that way. Factors that remain consistent in the environment work to keep the form or topography of the behavior close to that typical performance most of the time. When some of these controlling factors are removed or lose their effectiveness, other factors may start having greater influence and the behavior starts to deviate even more from the previously typical behavior. This process is sometimes called *behavioral drift*. Physicists use the term *entropy* to describe the tendency of the amount of disorder in a system to increase over time if things are left to themselves. Same idea.

In the natural environment, where the effective feedback and contingencies are less consistent, we are more often taking our chances with random, inconsistent antecedents and consequences, so even well-trained and practiced behavior patterns have a tendency to get sloppy if we're not careful. To avoid excessive drift we still need occasional positive reinforcement to keep us on the right track, sort of like resetting a fine watch when it starts to lose time.

In a prosthetic or therapeutic environment we might employ response differentiation (OK, go back and look up *response differentiation* if you need to) by using extinction to weaken these tendencies to drift, while using positive reinforcement to strengthen the more precise performance that we hope to encourage. Think of little tug boats gently nudging a big ocean liner on its way toward the dock in the harbor, as they try to keep the ship on a precise, straight, and narrow course, while the wind and currents work to turn the ship from its course. Perhaps positive feedback from a music teacher or a skating coach works as the positive reinforcement that helps make a top-level performance become a more consistent habit.

On the other hand we might do just the opposite and use this tendency toward behavioral drift to our advantage. We might use shaping to strengthen the deviations that we consider to be improvements, while we use extinction to lessen the likelihood that the more typical performance reoccurs. We try to move on and leave old habits behind.

One example of behavioral drift that we've probably all experienced has to do with our handwriting. Back in the early grades when teachers put a lot of emphasis on neatness and letter formation, many of us probably routinely wrote more legibly than we do today, particularly if our fine-motor coordination was developing well. Taking fast lecture notes in high school and college is a great way to mess up your handwriting. In addition, few people are correcting us for sloppy handwriting these days.

The notion of drift can apply to larger situations such as a classroom too. Maybe Ms. Smith's class has a very consistent and well-practiced routine for coming back from recess and getting right to work on an extra silent reading period. She has worked hard all fall to get this routine established and it makes her feel happy to see her students follow it so well.

Toward the end of November Ms. Smith goes out on maternity leave and Ms. Jones comes in as a long-term substitute teacher for the class. While Ms. Jones is a fine teacher, she doesn't know anything about the "from recess right to silent reading" policy. For the first few days the class still follows the old routine out of habit, but before long one or two of the children may dawdle and chat a little longer before getting down to work. Ms. Smith isn't there to guide them back on the straight and narrow, and to Ms. Jones it's no big deal. She thinks of this time as sort of a free period for students to use as they want (within reason), so she doesn't intervene one way or the other. Soon we have four or five students drifting away from Ms. Smith's routine and, as I'm sure you can imagine, before long there are only a handful of students still making much of an effort to do silent reading.

Behavioral sociologists would say that behavioral drift occurs on much larger scales too. It often happens to the culture of a school or other organizations and even to the culture of the larger society. This

process contributes to changes in cultural practices and values over time, but this is a topic for another time and place.

In some situations behaviors tend to drift more than in other situations.

BEHAVIORAL MOMENTUM

Behavior that has received a lot of reinforcement on intermittent reinforcement schedules is sometimes quite resistant to change, even when the reinforcement is decreased or stopped. The degree of resistance to change is thought of as the behavior's *response strength* and the tendency of the behavior to just keep going on, unless something else happens to change it, is called *behavioral momentum.* In science class you might have learned about what physicists call *inertia.* That is, the tendency of an object to keep moving on the same way it has been moving (or just staying still if it hasn't been moving) until some new force acts on the object. Behavioral momentum is the same idea.

Procedures based on behavioral momentum can sometimes be helpful in dealing with noncompliance situations. (That is, not doing what you are told to do.) Suppose Dick won't take out the trash when we ask him to. But we know that there are many things that he will do. So next time we try to get some behavioral momentum built up before we tell him to take out the trash. We might accomplish this by using what some experts refer to as an *antecedent high-probability command sequence.* In plain English, we can set this up by first instructing Dick to do several of the reinforcing activities that we know he is very likely to do. We might start by asking Dick to show us his new toy space ship that he doesn't seem to be able to put down. Then we might tell Dick to go turn on the TV, then go out to the car and bring in the package of cookies we left there so we can have a snack, and so on. Once we've built up the behavioral momentum and Dick is moving along and complying with our directions (and receiving a lot of reinforcement for complying), we again tell Dick to take out the trash. Research has shown that this method really does increase our chances of getting compliance. It doesn't work all the time, but certainly can be worth a try.

In classroom situations teachers can help get the day off to a good start by beginning the day with well-liked activities. Once things are under way the less enjoyable work can be done, then, toward the end of the day, teachers can finish up with more popular activities again. This is kind of like making a sandwich with the hard work put in the middle between two slices of more reinforcing activities.

CHAINING

Chaining involves taking two or more relatively simple behaviors and combining them like links into a more complex chain of behaviors. For example, Dick might be taught to brush his teeth by first wetting his toothbrush, next putting paste on the brush, then moving the brush over his teeth. Or to first put on a shoe, then pull the laces tight, and finally tie the knot. The various steps are taught one after the other. Since we still want Dick to perform each step, chaining is not the same as shaping.

BACKWARD CHAINING, REVERSE CHAINING

There is also *backward chaining* or *reverse chaining* in which we start with the final link and build additional steps in front of each newly acquired behavioral step. For example, Jane might first be taught to move the brush over her teeth. (But we've already put the paste on for her.) Next she is taught to put toothpaste on the toothbrush herself. Now we have the short chain of putting on paste and brushing. Later we add taking out the toothbrush and so on to lengthen the chain thereby helping Jane to become more independent. Since the older links have been learned and practiced longer, they have received more reinforcement and become more firmly established than the newer links, which are more distant from the goal behavior.

A stimulus that is paired with or that directly precedes reinforcement tends to acquire reinforcing qualities and often then works as a reinforcer itself. So each link in a chain has two functions or jobs, one in relation to the behavior before it and one in relation to the behavior behind it. It's kind of like the two relationships of being the child of your parents, but also being a parent of your child.

Each link reinforces the behavior it follows and serves as an S^D to the behavior it precedes.

Each link becomes a reinforcer for the behavior that precedes it and an S^D that signals that more reinforcement is coming if the chain is continued. As the sequence or chain of behaviors leading to the goal begins and then continues, the chain builds up momentum and becomes more difficult to stop. Many of us have experienced this momentum when attempting to diet. If we have a cache of cookies squirreled away in a secret place, once we start the chain it gets harder and harder to stop, like a snowball rolling down hill, as we go through the chain of behaviors leading up to the eating of the cookie. Going to the room where the cookies are hidden, opening the cabinet, taking down the container, taking off the lid, and… well, you know the rest.

This happens with many consummatory behavior problems, not just eating cookies. (Think about smoking and drinking.) These behavioral habits are a lot easier to stop earlier in the chain. It may work even better to avoid the S^D (or temptation, or "near occasion of sin") to begin with. How many of us, how often, can really have just one bite if we let the chain go to the end? A potato chip company used to market their product with the slogan "Bet you can't eat just one!" And if we do, how many *one bites* do we have? And how often? This is a natural chain that we're better off breaking early.

Backward chaining is often an effective technique for memorizing lists, poems, prayers, songs, and the like. By working backwards, once we begin to recall and recite the piece, each successive section that comes along has been more firmly learned than the earlier sections, making it less likely that they will be forgotten and more likely that this piece will be successfully remembered and completed. Backward chaining often works faster than forward chaining, since the final link is closer to the reinforcer and the newly added links are both reinforced sooner and become effective reinforcers themselves sooner.

On the other hand, backward chaining isn't the greatest for everything. For example, backward chaining is not so good for teaching word pronunciation.

Many of these procedures are used together in combination to teach a new behavior. Behaviors are often acquired through

shaping, strengthened through reinforcement, occasioned by S^Ds, and combined into chains.

Although we've talked about chaining as a way to build new behaviors, chaining has also been used at times to weaken unwanted behaviors. Making behavior inefficient can be an effective way to get rid of it. By adding more and more steps to a process, the reinforcement is delayed more and more and made so remote that it loses its effectiveness. Sometimes grievance and consumer complaint processes are designed to be so lengthy and complicated that they discourage people from using them, or if they start, most people give up before following through to the end.

FADING, PROMPT FADING

Once a behavior is established through the use of reinforcers and discriminative stimuli such as direct artificial prompts or cues, these S^Ds can be faded, or gradually removed from the situation bit by bit, known as prompt fading, leaving more naturally occurring S^Ds to prompt the behavior. Handwriting programs that use visual guides for the learner to first trace whole words or letters, then switch to partial letters with fewer and fewer of the letters provided to be traced, and finally just lined paper, while the quality of the student's writing continues to meet acceptable standards, are examples of the use of *fading*. We continue to reinforce the target behavior while slowly and progressively diminishing the S^D. Since the last links in a behavioral chain are generally the strongest, it is generally best to fade prompts from the end of the chain first.

Another example would be teaching Jane to cross a street safely. You first walk with Jane to the crosswalk. Then you might say, "OK, Jane, now stop and wait," and next you give a long list of detailed verbal prompts, such as, "Look both ways," "Look at the pedestrian crossing lights to be sure they are green and say 'Walk!', rather than red and 'Don't Walk!'", and so on. When, with detailed prompts, Jane follows the correct sequence, the prompts are gradually faded to shorter, less specific prompts, as Jane continues to perform the same behavior, perhaps even a question such as "OK, we're at the corner, what do you do now?"

Have you ever taught a dog to come when called? You might have done it something like this: your verbal command "Come" was followed by pulling on the leash or rope, like reeling in a fish, then a more gentle tug as a reminder to get Lassie started, and eventually the verbal command "Come" alone was sufficient. You gradually *faded out* your assistance, until finally good old Lassie was coming all by herself when you called (assuming you treated Lassie nicely when she got to you, of course).

We need to be careful not to overuse artificial prompts. We should reduce prompts as rapidly as possible to minimize the chances of Dick getting stuck or overly dependent on a prompt, which can happen quickly.

In spite of our best efforts we may find that Dick performs a behavior quite well when given a substantial prompt, but without that prompt, we get nothing, at least not the behavior we are looking for.

PROMPT DEPENDENT

If Dick seems to become dependent on a particular prompt, if he doesn't perform the wanted behavior without that prompt, we could say that Dick has become *prompt dependent.* People who get stuck on prompts just don't seem to be able to get along without them.

Prompt dependency can often be avoided by closely monitoring the prompted behavior as we fade the prompts and then, based on what we find, adjusting the size of the next step in the fading process to ensure success. Perhaps we are expecting Dick to take too big a step too soon. Don't forget, behavior change doesn't usually happen overnight. Adding another intermediate step or two as we work our way down the prompt hierarchy often helps.

PROMPT HIERARCHY

A set of prompts arranged by how much help they are expected to give is called a *prompt hierarchy.* Examples of a range of prompts from most to least intrusive would be providing hands-on physical guidance, demonstrating or modeling the target behavior, verbal instructions, gestures such as hand signals, written or pictorial/symbolic checklists, or placing objects in an obvious, easily

noticeable position. Each of these general types of prompts can be broken down to less complicated steps themselves as needed.

MAINTENANCE OF BEHAVIOR

Just because Dick can do something, it doesn't mean that Dick will do it. Once we've taught Dick a useful new behavior it is important that he continues to perform that behavior at the right time and in the right place. This is where the concept *of maintenance of behavior* comes in. That is, putting a plan in place to help the new behavior continue on as we fade out the artificial supports. Perhaps we had to come up with a complicated behavioral program with lots of reinforcers to get Dick to do whatever it was we wanted him to do. That might be OK in the short run, but certainly isn't ideal and can't go on forever. So now we set out to see that Dick's new behavior is maintained as we normalize his environment, often by integrating Dick into a mainstream classroom, and try to transfer the control of Dick's behavior to more natural reinforcers in the natural environment, which helps with maintenance and generalization.

GENERALIZATION

Generalization has to do with the spread of the effects of stimuli and behaviors from specific instances to broader or more general situations. Technically there are different types of generalization but for us the most important has to do with getting Dick to appropriately use certain behaviors in a variety of situations. Sometimes after a lot of hard work in a unique highly structured situation a teacher might teach Dick to respond when she says, "Good morning, Dick," by making good eye contact with her, smiling and saying, "Good morning, Ms. Smith." But that's it. A more long-term goal of course would be for Dick to respond the same way to Mrs. Brown, the principal, and Mr. Jones, the custodian. If Jane has learned that Mrs. Robinson is a lady and says that Mrs. Robinson is a lady when she sees Mrs. Robinson, Jane might generalize this response by saying "lady" when she sees Ms. Smith, Mrs. Sullivan, and Mrs. Ryan too. There are now more stimuli that lead to the same response, saying "lady." This is stimulus generalization.

Although, for many of us, once we've acquired or learned new behaviors it is easy for us to perform them any place, any time, for many children and adults with special needs it is much more difficult. A lot of additional work may have to be put into helping the new behaviors to generalize to a wider variety of situations and eventually, it is hoped, to the good old natural environment. Sometimes we have to directly teach the new behavior in several different situations. Many of the methods used to assist with this generalization emphasize the use of stimulus control techniques. The process of getting the behavior to happen in a greater variety of settings and situations is sometimes called *transfer training*.

There is also response generalization, which describes what happens when the same stimulus leads to different responses. Jane may have learned to say "Mama" when she sees her mother. As time goes by she might start saying things like "Mommie," "Mother," or "Mom." This is response generalization since although the stimulus may have remained the same, there are now a greater number of responses to that stimulus.

Dick's speech therapist, Mrs. Sullivan, might find that she has taught Dick to speak very clearly when he is talking with her in the speech office. But Dick's classroom teacher says that when Dick gets back to class he falls back into his old bad habit of mumbling his words. So Mrs. Sullivan starts spending some time in the classroom with Dick. This enables her to see for herself just what happens when Dick is speaking. It puts her in a position to prompt Dick to speak clearly and either to reinforce his behavior when he does speak clearly or to correct him when he does not. Perhaps Mrs. Sullivan's presence will serve as an S^D for Dick to speak clearly in the classroom setting. Dick may find that his classmates pay more attention to him when his speech is easier for them to understand. Over time Dick gradually learns the habit of speaking clearly in the classroom, and other characteristics of the classroom begin to become S^Ds for clear speaking. So eventually Mrs. Sullivan can slowly fade herself out of the classroom while Dick's clear speaking behavior is maintained by natural consequences in the natural environment.

ATTENTION

When we talk about paying *attention* to something or someone, we're usually talking about a behavior of ours that recognizes or acknowledges the existence of something or somebody. In human interactions our attention indicates that we notice that someone else is there. Since people are social beings, one of the most powerful reinforcers to most of us is attention from other people. If we think about it, whenever we receive almost any reinforcement from anybody, we are also getting attention from them. As a result, attention can pick up a lot of reinforcing qualities from its association, or pairing, with other reinforcers. The more important the person giving the attention is to the person getting the attention, the more powerful as a reinforcer that attention usually is. Attention can come in many forms: a smile, a word, a physical touch, a meeting of eyes, a laugh, a punch, a kick. These are all forms of attention. So attention can usually be used to increase a behavior and, as we said earlier, this would be considered positive reinforcement.

In a classroom, attention can come from anyone. Both teacher and peer attention can be very powerful reinforcers. The attention doesn't have to be what could generally be thought of as nice or pleasant attention in order for it to be reinforcing. In classroom situations, teacher reprimands sometimes reinforce the unwanted behavior, or at best are neutral and ineffective. Sometimes getting yelled at by a teacher in front of a class can be very reinforcing. The public nature of a teacher's reprimand in front of a classroom full of giggling peers can really complicate the situation. Instead of decreasing the behavior the teacher wishes to reduce, it may actually serve to increase it. *Soft reprimands* is a term used to describe talking quietly to Dick in a public situation so that the reprimand is not heard by classmates and is less likely to reinforce the unwanted behavior. The same reprimand given more publicly may serve as a reinforcer.

As we discussed earlier, by withholding attention right after a behavior you want to decrease, you may be extinguishing it. The behavior would not extinguish, of course, if the attention withheld was not reinforcing the behavior in the first place. People will often try ignoring a behavior they hope will go away, but it may not seem to do any good. Well, if that's the case, it probably is something

else, possibly attention from someone else, which is reinforcing the behavior in the first place. And of course attention from some people in some situations can be very aversive and function as a punisher, particularly for young children, or for an adolescent being teased or bullied by peers.

JOINT ATTENTION

Speaking of attention, another term we might hear in regard to children with various ASDs is *joint attention*. While joint attention isn't really a behavioral principle or treatment procedure, it does describe an important set of behaviors that generally comes about at approximately 9–18 months of age as most children develop. Essentially, *joint attention* refers to the child shifting attention back and forth between what she is doing and who she is doing it with. Suppose Jane is sitting at the kitchen table working on a jigsaw puzzle with Dick sitting next to Jane encouraging her. If Jane adds a difficult piece to the puzzle Dick might say, "Oh you found a tough one Jane." If Jane looks to Dick, makes eye contact and smiles, thereby acknowledging his presence before turning back to look for another puzzle piece, that would be an example of joint attention. This is a particularly important behavioral pattern to watch for and work on with children with suspected social disabilities.

An attention-related problem commonly seen in people with ASDs is called stimulus overselectivity.

STIMULUS OVERSELECTIVITY

Stimulus overselectivity refers to focusing in on just one part of something, and "not seeing the forest for the trees," as is sometimes said. For example, Jane might be observing two of her classmates having a conversation, but she is so tuned in to the words they are saying, she doesn't notice their facial expressions and body language, which could also give her a more complete understanding of what's really going on between her classmates. Or perhaps in his speech therapy session with Mrs. Finnegan, Dick pays such close attention to watching her lips move that he doesn't hear a word she is saying.

One very common way of giving attention to someone is by giving them a compliment. When trying to give verbal compliments

we want to make sure that the words we choose really do work as reinforcing compliments. Usually if the child just understands what the words mean ("You drew that picture of a tree beautifully, Jane!"), that gets the job done. At other times the words might not seem to have formal dictionary definitions that literally make it clear that they are intended as compliments, but the context in which they are used and the enthusiasm with which they are given gets the message across. Forty-something years after I first saw the movie *Mary Poppins*, I still can't find supercalifragilisticexpialidocious in my dictionary, but I still know that if someone tells me that something I did was supercalifragilisticexpialidocious, it is probably meant as a compliment. When working with children who have more limited verbal repertoires and who have difficulty with the less-literal meaning of words, we need to be particularly sensitive to the effects of new verbal compliments that we may be using. Delivering these verbal compliments enthusiastically and occasionally pairing them with already established reinforcers can be a big help.

While using attention in the form of verbal compliments to reinforce good behavior when it occurs is usually a good idea, one problem that can come up is that repetitive and unenthusiastic-sounding compliments can soon begin to wear thin. Jane may only be able to hear. "Very good, Jane!" so many times before she closes her ears and stops hearing it.

Fortunately, there are seemingly countless ways to give someone a compliment. In thinking about reinforcers we should keep in mind that variety is the spice of life and that nearly all reinforcers should be changed, or at least given a rest, from time to time. But we should balance this guideline with our awareness that some children really do *not* like change and variety. We need to be observant of what, if any, effects the changes we make in Dick's environment have on his behavior. The bottom line is: if it works like a reinforcer, it is a reinforcer. If it's not working like a reinforcer, it is not a reinforcer.

I have a cousin who is an elementary school teacher. She told me that when she started teaching some years ago her mother (my aunt) made her a wonderful list of things to say to compliment her students. There is a nice list of compliments that's been around for a while and that I've recently seen on several websites (e.g. www.careerlab.com/99ways.htm) entitled *99 Ways to Say*

Very Good. This list was compiled by Arzella Dirksen, founder of *HelpCenter 4*, a television consumer hotline at KCNC television in Denver, Colorado, and is a good place to start to get some variety into what we are saying. Some other examples of variations that I've heard over the years include:

"Well done!"

"Nice!"

"I'm impressed!"

"All right!"

"You rock!"

"You're on a roll!"

"Way to go!"

"Bull's eye!"

"A 1!"

"Dyn-o-mite!"

"X O!" (I'm told that X O stands for kisses and hugs), and of course, "Supercalifragilisticexpialidocious!"

When attempting to give verbal reinforcement, it's important that Dick and Jane know just what it is that they did that we are complimenting. Just because we know what we're talking about doesn't mean that everyone else does too, particularly children. We shouldn't always take it for granted. So be ready to add specifics to your comments when there might be confusion, such as, "Great job *on your spelling today Jane*," to help make sure you're on the same wavelength.

I'll bet you could add a lot more versions of "Very good!" to these lists too. But, most importantly, no matter how you say "Very good!," say it sincerely.

DIFFERENTIAL REINFORCEMENT

With some behaviors that we are trying to encourage we might be happy and willing to reinforce them any time, any place. This is

particularly true when new desired behaviors are just being learned. But most behaviors are more appropriate in some situations than in other situations. *Differential reinforcement* refers to reinforcing a behavior in some situations, but not in other situations. These different situations could be the presence or absence of a particular stimulus. (Remember S^Ds and S-deltas?) Jane's singing might be reinforced at choir practice but if she starts singing the same song during reading class, no reinforcement. Even though Jane's singing may be reinforced when she sings well at choir practice, Jane's singing may not be reinforced if she sings off key or if she sings too quickly.

STRATEGIES FOR THE CLASSROOM

Remember back in Chapter 4 we talked about continuous, intermittent, and ratio reinforcement schedules? Well, the scheduling of reinforcement doesn't stop there.

DRO

One type of differential reinforcement that is commonly used to weaken and eliminate troublesome behaviors is called *differential reinforcement of other behavior* (*DRO* for short, pronounced by just saying the letters D, R, O). DRO is an application of interval reinforcement schedules. In *DRO* Jane is reinforced according to a set schedule as long as she does not perform the target behavior at a particular moment (momentary DRO) or during a particular time period (interval DRO). And of course those intervals and moments can be fixed or variable, as with the reinforcement schedules we talked about back in Chapter 4. We might choose a time interval such as five minutes and say that if Jane doesn't bite her fingernails even once during that five-minute interval she earns a reinforcer. Or we might say that if she is not biting her nails at a specific moment, say 9:05:00, Jane earns a reinforcer. These arrangements would be called interval or momentary DRO respectively.

In DRO any other behavior except the target behavior is reinforced. While DRO can lead to rapid reduction of the target behavior, there is the danger of accidentally strengthening another undesirable behavior. (Remember accidental reinforcement and

superstitious behavior?) Although extinction and time out (later in this chapter) are typically not very effective in treating behaviors maintained by automatic reinforcement, DRO and other types of differential reinforcement can be helpful.

DRI

A second kind of differential reinforcement is *DRI*, or *differential reinforcement of incompatible behavior*. In DRI Dick must be performing a behavior that is incompatible with the target behavior, a behavior that cannot be performed at the same time. For example, if Dick chews his fingernails, he may receive scheduled reinforcement if he is clapping his hands, playing a musical instrument, or swinging a baseball bat, none of which could be done with his fingers in his mouth. So in DRI there are two conditions: the target behavior is not occurring and another behavior is being performed that makes it impossible to perform the target behavior at the same time. Substituting effective, useful adaptive behaviors for unwanted maladaptive behaviors with which they are incompatible is a common practice in ABA and behavior therapy.

DRA

DRA stands for *differential reinforcement of alternative behavior*. A lot of different things have been called DRA. At its broadest, a specific alternative behavior rather than just anything else but the target behavior (as in DRO) is selected for reinforcement. In the broad sense DRA is a lot like DRI except that the alternative behavior reinforced doesn't have to be incompatible with the target behavior. For example, Dick likes to amuse his friends and get his teacher's attention by poking Jane with his finger as they line up to go to art class. His teacher does not feel that she can try to extinguish this behavior by ignoring it. So she asks him to engage in an alternative behavior of checking off the names of each child on a class list. This is much more reinforcing to him, and he happily switches his behavior from poking to checking.

Remember one of the problems with using extinction was that we could end up with an extinction burst? Well, there are times, particularly when we are dealing with behaviors that are dangerous to the child or to others, that we just can't risk increasing the target

behavior. Applications of DRA have sometimes been effective in getting rid of the maladaptive behavior without getting that nasty old extinction burst. In using DRA for this purpose we first must figure out what the reinforcers are that are maintaining or keeping the maladaptive target behavior going. Then, instead of just stopping the reinforcement, we select another alternative behavior and provide the same reinforcement for that behavior. Did I say the same reinforcement? While we do use the same reinforcers, we pay them out on a more dense or richer reinforcement schedule.

For example, one day, when especially frustrated, Jane started crying and scratching her arms severely in class. When she did this Ms. Thurber, the teacher's assistant, took Jane aside and talked to her to calm her down. Jane really enjoyed this individual attention from Ms. Thurber and started to cry and scratch more often, as often as once every day, with Ms. Thurber continuing to calm her down. If we were to try to eliminate Jane's bad habit by having Ms. Thurber ignore Jane when she acts up, chances are good that Jane would cry and scratch herself even more intensely in hopes of having Ms. Thurber give her attention again. This would be very disruptive to the class as well as seriously harmful to Jane. So we give Jane an alternative way to get some time alone with Ms. Thurber. We might arrange things so that whenever Jane successfully completes a class activity she and Ms. Thurber take a five-minute walk around the school together, which could happen several times each day.

We now have two alternative behaviors being reinforced with the same reinforcer, Ms. Thurber's attention, but on different reinforcement schedules. There is no longer any need for Jane to resort to hurting herself to get Ms. Thurber's attention. By adding additional reinforcement to Jane's life we have also increased her general level of reinforcement, which is usually a good idea when attempting to eliminate a previously reinforced behavior. When all this is done and the maladaptive target behavior is a thing of the past, we can gradually thin the reinforcement schedule for the alternative behavior to a lower level while maintaining the same rate of behavior and avoiding that extinction burst (we hope).

LIMITED HOLD

One schedule that just about every parent and teacher has used is called *limited hold*. Limited hold is pretty much just what it sounds like. The payoff is available for a limited time only. A coupon from a restaurant for $22 off the cost of a meal would be an example of something I just lost out on by missing the expiration date while I was writing this book. Or: "Dick, if you put your toys away before I count to ten I'll read you a story." Another example would be if Jane has to turn in a book report by Friday in order to receive credit for the report.

DRH

DRH, or *differential reinforcement of high rates of behavior*, is a way to speed up slow pokes. Generally the target behavior must be repeated several times within a relatively short time period to receive reinforcement. Not too long ago I heard a story on the news about some skinny little guy who won a prize for eating the most hot dogs in something like 15 minutes. DRH. Jane may need to complete ten math problems in one minute to get an A, if it takes her two minutes she gets a B, or three minutes a C. Jane's teacher may offer a prize to all the students who can write the names of ten presidents in one minute.

DRL

DRL, on the other hand, stands for *differential reinforcement of low rates of behavior* (as if you didn't guess that yourself by now) and can be used to slow things down. A speech therapist working with a student who talks too rapidly might use DRL to help the student learn to slow down and speak more clearly at a more understandable rate. Teachers often have to work hard to encourage students to participate in class. Sometimes, though, a student becomes an overenthusiastic participant and starts monopolizing things by asking question after question after question. The teacher doesn't want to eliminate Dick's participation entirely, just reduce it to a more reasonable level so other students have a chance too. So the teacher decides to reinforce Dick's attempts to participate by only calling on him when he's gone at least two minutes without trying to ask a question.

NCR

NCR, or *noncontingent reinforcement*, is a procedure in which consequences that normally work as reinforcers are given every so often, regardless of whether the target behavior usually reinforced by those consequences occurs or not. I know that might sound crazy to those of you who have been paying attention up to now, but let me try to explain. NCR isn't really intended to reinforce or strengthen behavior, but actually is kind of a round about way to diminish the target behavior. Here's why. By providing the "rewards" noncontingently, over time these rewards begin to lose their control over the target behavior. We weaken the connection between the behavior and the consequence. Performing the target behavior is no longer necessary to get the reinforcer. How many of us would continue to put in 40 hours of hard work every week for our little paychecks if a check arrived in the mail every week whether we went to work or not? That check wouldn't be such a powerful work incentive anymore would it?

NCR sounds a bit like the interval reinforcement schedules we talked about back in Chapter 4, but there is a big difference. As I hope you remember, in the FI and VI schedules the reinforcers are given on the first occurrence of the target behavior after the required interval has passed. So if the interval is ten minutes and after that ten-minute interval another minute goes by before the target behavior occurs, we end up with 11 minutes between reinforcers this time. On the other hand, with NCR if ten minutes is the interval, ten minutes is when the reinforcer is given (and it is hoped that it is not too soon after the target behavior). NCR can be used to reduce the need to engage in certain maladaptive behaviors that once were the easiest way to obtain certain reinforcers. NCR can be an alternative to extinction and the extinction burst, particularly with self-injurious and other dangerous behaviors. However, when used this way NCR should be thought of as an interim step to control maladaptive behavior until more appropriate replacement behaviors can be taught. When using NCR to weaken one unwanted behavior, we should be on the lookout for accidentally shaping some other unwanted behavior.

CONTINGENCY CONTRACT, BEHAVIORAL CONTRACT

A *contingency contract* is sometimes called a *behavioral contract*. It is easier to change behavior if the persons whose behaviors are being changed know exactly what they are supposed to do and what the consequences will be both if they perform acceptably and if they do not. Although it is not always necessary, it is often helpful to write this down in a formal contingency contract. A contingency contract is simply a written (usually) statement of what the student is expected to do and what the consequences will be. You might have a contract at work that, among other things, says that for every hour you work you will be paid X dollars. The contract normally follows the form "If you do A, then I will do B" or "If you do A, then you can do B."

Once the contract is written up, it can be helpful to make additional copies and have a formal signing by all parties involved and a witness or two. The formality of some sort of ceremony can help to motivate children to comply with the conditions of a contract. It is also helpful for them to have a written reminder of just what is expected of them. The social presence of family, thereby involving important adults in the child's life, can help the contract get off to a good start.

Sometimes contracts that seem like good ideas at the time have unforeseen loopholes or other problems built in. It is a good idea to read the proposed contract from the child's point of view to try to spot potentially awkward problems. Initially the contract should be written for a limited time period, no longer than one week, to allow the adults to gracefully get out of it and renegotiate if there is an unseen loophole or some other problem.

TOKEN ECONOMY

Another useful technique in a classroom situation is some form of a *token economy*. We already know that the reinforcement, or punishment, or response cost, or whatever we choose to use, should follow immediately after the target behavior or else we risk modifying the wrong behavior. While it is not always practical to distribute reinforcers immediately, it is nearly always possible to administer generalized secondary reinforcers such as tokens, chips, stars, points, stickers, or tickets as substitutes that can later be

redeemed or exchanged for backup reinforcers. This is especially helpful with children who are insufficiently motivated by delayed rewards or other incentives that to them seem so far in the future that they lose their reality and therefore their effectiveness. Giving them something tangible brings the future reward much closer in terms of effectiveness. This is the principle that the famous S & H Green Stamps of years past worked on. The behavior the stores wanted to increase was the customers' spending their money. So as soon as customers paid for whatever they bought, the customers were immediately given some green stamps that they could save up and eventually redeem for a choice of reinforcers.

REINFORCEMENT MENU

The S & H Green Stamps company published a catalog with a list of prizes or reinforcers the customer could choose from. The catalog also listed the price of the reinforcers in numbers of green stamps. This catalog was an example of what we call a *reinforcement menu.*

A reinforcement menu can be drawn up which is a list of reinforcers that the child can choose from. Each item should have a designated price. The price is the number of tokens the item costs. Reinforcement menus are usually constructed to go along with token programs. This helps reduce the chance of *reinforcer satiation.* If only one reinforcer is used, pretty soon almost anyone will get tired of it and it will lose its effectiveness. But by providing a selection of reinforcers to choose from, we increase the probability that we have something that is appealing. It is also helpful to use reinforcers that can only be obtained by performing the behaviors required by the program and that are not readily available in another way. Additionally, the menu items available should be changed periodically, and the students involved should have some say in choosing the new reinforcers and be kept up to date regarding the changes.

REINFORCEMENT AREA

Some teachers set up what we call *reinforcement areas* in their rooms. This might be a table with a selection of toys, books, games, puzzles, and other fun activities. The children can earn access to this area for varying lengths of time (e.g. five to ten minutes) by producing

schoolwork or other forms of desirable behavior. This technique also helps lessen the problem of reinforcer satiation.

With all this talk about reinforcement in ABA, one bit of misinformation out there is that positive reinforcement is nothing more than bribery. Let me try to set this one straight.

BRIBERY

Bribery is not an ABA term but in the ABA world we too often hear bribery mistakenly used to describe positive reinforcement. My *Oxford American Dictionary* defines a *bribe* as "…persuad[ing] a person to act improperly in one's favor by a gift of money, resources, etc."(1999, p.114) So by definition *bribery* refers to using incentives to bring about illegal or immoral behavior, not to all uses of positive reinforcement.

In many cases bribes are given *before* the behavior in question, and we all remember that reinforcers are given *after* the target behavior, don't we? Most of us get paid one way or another to do our jobs and we don't think of that as bribery do we, so if we as adults get positive reinforcement to do our jobs why shouldn't kids receive some positive reinforcement to do their work?

Whether we like it or not, positive reinforcement is one of the basic laws of learning that has been demonstrated and proven countless times, both in psychology laboratories and in the real world. Being mad at the laws of learning on philosophical grounds is about as helpful as being mad at the law of gravity. That's the way the world works and it isn't going to change any time soon.

RESPONSE COST

We talked a bit about *response cost* back in Chapter 4. To refresh your memory, response cost is an aversive procedure but without as many drawbacks as punishment. A fine is a type of response cost that can easily be built into contingency contracts. While a list of fines can be included in a written contract, either with or without a contract it can be helpful to publicly post a fine schedule. When using fine systems or any response cost based intervention it is important not to let the students get too far in debt.

If you are using both reinforcement and response cost procedures at the same time, the reinforcers that can be earned should not be the

same as those that can be lost. Once a reinforcer is earned it should almost always be delivered (but perhaps delayed), even if undesirable behavior is costing the individual other reinforcers.

TIME OUT

Time out (short for time out from reinforcement) is a term we hear a lot these days, but the name *time out* and the procedure *time out* are both often misused. Sometimes we either cannot find out what is reinforcing a specific behavior or there are so many things reinforcing the behavior that it just isn't practical to control them all. If this is the case and we really want to control the behavior at hand, we must then remove Dick from the reinforcer-loaded immediate environment. We often accomplish this by placing Dick in a *time-out* area, which is usually a room or space without reinforcers. (Does solitary confinement ring a bell?)

Properly applied, time out should involve the separation of Dick from all sources of reinforcement, either by withdrawing reinforcement from the situation or by removing Dick from the situation that has reinforcers in it, perhaps by sending him to a corner, behind a partition, or to a nearby room. This should immediately follow the target behavior, but should be for a relatively brief length of time. Ten to fifteen minutes per episode is usually sufficient. A good rule of thumb to use is one minute in time out for each year of the child's age, so a seven-year-old might get seven minutes in time out. But going much beyond ten minutes, assuming there is no tantruming or other maladaptive behavior going on, may be counterproductive. When an episode of tantruming of some sort is occurring, the start of the timing of the time-out period is often delayed until the tantruming ends. In the complicated real world of learning in a natural environment, time out probably includes elements of punishment, response cost, and extinction. But in some cases time out can function as a positive reinforcer, or even a negative reinforcer if the child is over-stimulated in the natural environment. After all, don't we all enjoy a little peace and quiet once in a while?

The two most important things to remember about time out are that it must follow immediately after the target behavior so that there can be no opportunity for reinforcement from the environment, and the time-out area must have nothing about it that is likely to

be reinforcing. This includes no one to talk to, listen to, or watch. Delaying the implementation of the consequences to explain in detail, negotiate, argue, bargain, plead, beg, barter, or whatever can significantly reduce or totally negate any effectiveness the intended consequence might have had.

Many of the things we do in ABA involve gradual changes of one sort or another. In shaping we reinforced a succession of behaviors that gradually became more and more like the target behavior. In thinning we gradually lessened the frequency of reinforcement used to maintain the behavior and in fading we gradually diminished the prompts we were using to encourage a behavior while keeping the behavior pretty much the same.

DEMAND FADING

Another term that includes the word fading is *demand fading*. Demand fading usually involves the gradual tightening of the demands placed on the child in order to continue receiving reinforcement. Demand fading is mostly used with children who have a tendency to tantrum to escape or avoid the situation when certain demands are placed on them. Usually when we think of fading we think of something diminishing or getting smaller in one way or another, like the fading of a color in an over-washed shirt, but fading sometimes is used to describe gradually fading something in, or increasing it, like when the loudness of the sound track of a movie is gradually increased.

Dick might typically eat five bites of an apple. When he's told he now needs to eat ten bites, he is a good bet to throw a tantrum to get out of eating the apple. So when things are going pretty good we might fade in one additional bite, going from a demand of five bites to a demand of six bites, until this increase is accepted. Then up to seven bites and so on. This kind of reminds me of price increases at the store or gas pump.

There are a number of procedures used to reduce certain kinds of inappropriate behaviors that seem to be good old-fashioned common-sense types of punishment.

CORRECTION

The term *correction* means pretty much what it sounds like it means. If you make a mess you clean it up. Sometimes tantruming children

knock things over and throw things around. Picking up and putting things back the way they were would be forms of correction. If Dick's behavior resulted in his being given time out, correction and an apology are commonly used as the next steps after leaving time out.

OVERCORRECTION

Overcorrection refers to correction and then some. Maybe Dick is caught writing graffiti on a wall. In addition to cleaning off the graffiti that he wrote on that wall, our friend may also be required to clean the other walls in that room.

POSITIVE PRACTICE

Positive practice is a type of overcorrection in which the child essentially rehearses doing something properly over and over again. If Jane shouts "Give me a cookie!" she might be required to politely ask, "May I please have a cookie?" five times before receiving the cookie.

NEGATIVE PRACTICE

Negative practice involves performing the target behavior over and over, without reinforcement, as a way of decreasing the maladaptive behavior. Negative practice has been used effectively to help in the treatment of behaviors such as tics, stuttering, and other repetitive behavior patterns including bad habits that people sometimes engage in without realizing it, such as repetitive knuckle-cracking.

Negative practice has a lot of potential for misuse. If Dick performed an inappropriate behavior such as swearing, and was required to repeat that same behavior over and over again until the act of swearing became aversive to him, it would be considered negative practice. But with Dick and in nearly all cases there are better ways to deal with the target behaviors. Actually it's been quite a while since I've heard of it being used like this. I hope that you won't hear of it very often, if at all.

Since we're talking about types of practice, there are two other types of practice that I should mention which are used to strengthen learning.

MASSED PRACTICE

Massed practice refers to a situation in which the same behavior is repeated over and over in a relatively short time period. In some ways massed practice is like an extreme form of positive practice. Cramming for an exam can be thought of as a type of massed practice that many of us have experienced at one time or another. If Jane has a spelling test on Friday, she might wait until Thursday night and study the same words over and over for an hour.

DISTRIBUTED PRACTICE

Distributed practice is an approach to learning in which you don't put all your eggs in one basket, as you might with massed practice, but spread your practice out in smaller doses over a longer period of time. If Jane plans ahead for that spelling test and studies the same words for 15 minutes each night for the four nights Monday through Thursday, she still ends up studying the same words for the same total time of one hour. Assuming that enough studying or practice actually happens to learn whatever it is you're trying to learn, distributed practice usually results in better long-term memory or recall of whatever it is that we learned. When you just crammed for an exam you might have done well on the test the next day, but how long did you really remember after that?

SOCIAL SKILLS

SOCIAL SKILLS TRAINING

Social skills training is a term that describes any of several approaches used to teach people how to interact appropriately with other people. Targeted behaviors in social skills training often include behaviors such as eye contact, keeping appropriate social distance, and hand shaking. Video equipment can be a very helpful tool in both modeling appropriate behavior and providing feedback to students.

Much of the early research on social skills training dealt with teaching "dating" skills to college students. This was for several reasons, not the least of which was the ease in getting students to volunteer to be subjects for the research. A great deal of psychological research is conducted by faculty and graduate students at universities

because that is where they (the researchers) already are and they have a large pool of potential subjects (undergraduate students) to draw from. The student volunteers are often given small payments or extra credit in psychology courses for their help. Add to this that most college students want to improve their social lives anyway. Bingo! All the volunteers you'd ever need.

Back in Chapter 5 we talked about the difference between acquisition problems and performance problems. Making this distinction is particularly important during social skills training. Many people have already learned or acquired the appropriate social repertoire for a given social situation, but may be inhibited from using their social behavior effectively by emotional factors such as social anxiety. This is primarily a performance problem. For these people the treatment emphasis is likely to be on their emotional behaviors, perhaps by using forms of desensitization or assertiveness training. For other people they might feel perfectly comfortable in social situations but just don't know the right thing to do or how to do it. For them it's an acquisition problem first, then perhaps a performance problem. Jane might very nicely demonstrate an appropriate way of introducing herself to a new classmate when role playing, but may be prevented by anxiety when in real-life situations (performance problem). Dick may feel reasonably at ease, but might not know what to say to his new classmate (acquisition problem).

Although social skills can be taught in several different ways, many social skills training programs include the four steps of Structured Learning Therapy (Goldstein, Sprafkin and Gershaw 1976): *modeling*, *role playing*, *social reinforcement*, and *transfer training*. Suppose there is a problem with Dick's just reaching out and grabbing other children's snacks whenever he wants to. Our goal might be to have Dick ask nicely, saying something like, "Jane, may I please have one of your cookies?" We might first demonstrate to Dick by saying ourselves, "Jane, may I please have one of your cookies?" Next we role play that we are perhaps Jane and have Dick say to us, "Jane, may I please have one of your cookies?" In the role-play situation we give Dick *social reinforcement* for performing socially appropriate behavior (sometimes called *prosocial behavior*) by praising him and occasionally actually giving him a cookie.

VIDEO MODELING

Teaching social skills to children by having them watch videos of others demonstrating various social behaviors has been found to work well with many ASD children. *Video modeling*, as this procedure is called, has been particularly effective in teaching play skills. If you want to learn more about using video modeling you'll probably find the book *Video Modeling and Behavior Analysis* (Nikopoulos and Keenan 2006) helpful.

PHOTO CHAINING

Photo chaining is a technique used to teach behaviors by showing the child pictures of the various steps of a behavior sequence. This is an example of modeling. While often used to teach social behaviors, photo chaining can be used to teach other types of behavior as well. The child who views the pictures can also be the child seen in the pictures performing the social, self-help, or other behavior, thereby serving as his or her own model.

SOCIAL STORIES™

A well-known method for teaching social skills to individuals with ASDs that can also be helpful with most younger children is the *Social Stories*™ approach developed by Carol Gray (Gray and White 2002). Social Stories™ are an application of modeling that involve very brief, often illustrated, stories that model for the child the step-by-step performance of various social skills, basic self-help skills, safety, and hygiene behaviors. Stories are often presented with the pictures drawn in a sequence of boxes or frames as we commonly see in comic strips, using simple stick figures. In the boxes both speech and thought bubbles show what each person is actually saying or thinking.

BEHAVIORAL REHEARSAL

Combining role play of appropriate social behavior with the desired consequences is sometimes referred to as *behavioral rehearsal*. A series of scenarios, including the hoped-for consequences, can be practiced. As the child becomes more skillful in performing these behaviors the

therapist may add surprise complications to the situation to help the child learn to behave appropriately in a greater variety of situations. Once Dick has acquired the new social behavior and can adequately demonstrate the behavior in the artificial staged rehearsal situation, it is important that we help transfer the new behavior to real-life social situations where he will be able to use it effectively.

SCRIPTING

Scripting means pretty much what it sounds like, repeating previously heard and practiced lines. I remember one student who used to walk around his school repeating over and over again the line, "I want to buy a vowel," which fans of the American game show *Wheel of Fortune* will surely recognize. But scripting can also be used in a positive way. Students can be taught scripts to follow in various social situations. These scripts can then be practiced through behavioral rehearsal, sometimes using puppets as models to demonstrate. When Dick sees other children playing with toys that he likes, he often walks right up to the children and just grabs the toys that they are playing with for himself. Since this bad habit of his can be quite a problem, Dick might be taught to go up to Jane and say, "May I play with some of the blocks Jane?"

TRANSFER TRAINING

Transfer training is a term sometimes used to describe the general process of helping Jane to perform certain behaviors in new situations. This can be thought of as a kind of stimulus generalization. Depending on the situation, many additional steps may need to be added between some of these steps. We want to have manageable steps as we move from inappropriate social behavior toward more appropriate social behavior. Transfer training and generalization are both important to the spreading of new behaviors from carefully controlled prosthetic and therapeutic environments to more natural environments as the student is taken out to learn to deal with the real world.

GUIDED PRACTICE

In some cases verbal instructions and modeling aren't very effective in getting the message across about just what it is that we want Jane

to do and how we want her to do it. This is particularly true when we're talking about motor behaviors. Sometimes physical guidance of the proper movements is helpful; this is termed *guided practice*. If Jane's parents are trying to teach her to hit a thrown softball with a bat, maybe her mother will stand right behind Jane with her hands on Jane's hands and guide her through a swing as Dad pitches the ball.

RELAXATION TRAINING

Being able to relax is important for all of us. It helps us concentrate better when we are trying to pay attention to something and helps us settle down when we are angry, fearful, or otherwise emotionally upset, and being relaxed can help lessen the experience of pain. Various forms of *relaxation training* have been taught for years in all sorts of areas such as stress management training, childbirth classes, sport psychology, and the treatment of anxiety disorders. While there are numerous ways to learn to relax, perhaps the best known of the behavioral approaches is *progressive muscle relaxation* or *PMR*. Through progressive muscle relaxation we are taught to tense and then relax various muscle groups throughout our bodies, first individually and eventually all at once. This is a very useful self-control device that absolutely everyone has need for at some time or other.

People can be taught to use this technique to calm themselves down when they are upset or in anticipation of stressful situations before they occur. *Relaxation: A Comprehensive Manual for Adults, Children and Children with Special Needs* (Cautela and Groden 1978) is a very helpful guide book that describes how to individualize PMR for children with special needs. In teaching PMR it is often helpful to have the students learning the technique take the lead in directing group relaxation sessions for classmates. By talking their way through the process aloud and demonstrating to the group, they tend to learn the procedure better themselves and gain more confidence in its use.

Way back in 1967 my old graduate school friend Jeff Kean (with Anthony Graziano) published the first known (to me) report of successfully teaching PMR to a group of children with autism to counteract the children's "sudden high excitement leading to violent

outbursts, increased stimulation, and continued interference with acquisition of adaptive behavior" (p.253).

Well, there are countless more ways that ABA can be used that we could talk about, including ways ABA can be used for primarily educational purposes. That's where we'll pick it up in Chapter 8.

CHAPTER 8

WHAT IS BEHAVIORAL EDUCATION?

As we talked about earlier, ABA has very wide applicability. Not all applications deal with maladaptive behavior. There are many applications that we see mostly in schools that are very useful in general education as well as special education.

BEHAVIORAL EDUCATION

The use of programs and procedures based on behavioral principles in schools and other educational settings is sometimes called *behavioral education.*

DIRECT INSTRUCTION

One of the best-known behavioral contributions to education is *direct instruction.* Direct instruction involves a lot of scripted and sequenced instructions and prompts and requires the student to actively respond or perform a behavior correctly to receive positive reinforcement. The carefully prepared lessons have been tested and demonstrated to be effective with students with a wide range of special needs and socio-economic backgrounds. The frequent use of hand signals by the teacher is helpful in keeping the attention of students with ADHD and other attentional issues. Immediate correction of errors is an important ingredient. The lessons are presented at a fast pace. They are usually designed to have the students make at least ten active responses per minute. This high rate of student performance provides immediate feedback to the teacher so that any learning problems can be spotted and addressed as soon as possible.

DISTAR

Probably the best-known example of direct instruction is *DISTAR* (*Direct Instruction for the Teaching of Arithmetic and Reading*) developed by Siegfried Engelmann and his colleagues. For some reason they keep changing the name of the DISTAR programs. I think it's also been called *Reading Mastery* and is related to other programs such as *Horizon* and *Funnix*. While DISTAR reading is the best known, there are DISTAR programs for math and language as well as reading.

LANGUAGE FOR LEARNING

Language for Learning is an oral language program based on direct instruction. It is a descendent of the DISTAR language program. Although Language for Learning is designed for students in grades K–2, it has also been helpful with older students for whom English is a second language and students with special needs. There are Language for Thinking and Language for Writing programs available as well.

ERRORLESS LEARNING

People tend to find learning more pleasant and learn more when they have a high success rate. Wouldn't you rather get a 95 percent on a test than a 5 percent? Plus remember that whenever we do something we are practicing it and even though the old saying goes "practice makes perfect," a more accurate saying is "practice makes permanent." If we practice something over and over, whether right or wrong, it becomes a more firmly established habit, so better to be practicing doing something right than practicing doing it wrong. Much of behavioral education requires a lot of activity or behaving on the part of the students, demonstrating what they are learning as they go along. *Errorless learning* has to do with arranging things in a learning program to maximize success, like shaping, going from the known to the closely related unknown. When a mistake is made, usually additional prompts are given until the right response (which could be a verbal answer or some other action) is emitted, then immediate reinforcement and on we go… Errorless learning approaches are particularly helpful to get started on teaching new behavior to people who get frustrated quickly and don't take failure

easily. I can think of a quite a few people I know like that. How about you?

PRECISION TEACHING

Although *precision teaching* is a thoroughly behavioral approach to education it has a vocabulary of its own. One of Skinner's graduate students, Ogden Lindsley, is sometimes called the father of precision teaching. Now I wrote this book in the first place to help translate some of the specialized vocabulary of ABA into what I hope is plain English. Wouldn't you know it, even though precision teaching is a specialized application of ABA, Lindsley (Og, as he was known to his friends) thought the ABA vocabulary was too "jargony" and tried to come up with more easily understood alternatives for a lot of other ABA words. For example, in the precision teaching world the term *movement* is used rather than behavior. Remember Og's Dead Man Rule? Dead men shouldn't be moving, so they don't behave. Increasing or strengthening a behavior is referred to as *accelerating* while weakening or decreasing the rate of a behavior is called *decelerating*. *Pinpointing* is identifying the behavior or movement to be targeted and counted. *Aims* refers to the target rate at which, it is hoped, the behavior will be performed. There are no mistakes or failures in precision teaching, just correct responses and *learning opportunities*.

Three of the most important components of precision teaching are daily measurements of correct and incorrect responses, using standard charts to record and display these daily behavioral rates, and using this objective data to make data-based decisions about how best to teach the students. Actually, precision teaching is less of a teaching method and more of a means to evaluate the effectiveness of methods used in teaching. Skinner's daughter, Dr. Julie Vargas, who is a professor of behaviorology in the Department of Educational Psychology and Foundations at West Virginia University, has suggested that *precision measurement* might be a better term to use since the emphasis is on the accurate measurement of the effects of teaching rather than a specific teaching method. To paraphrase Skinner again, if there isn't learning, there wasn't any teaching.

FLUENCY

One of the key concepts of precision teaching is *fluency*, which is a combination of accuracy and speed. We see the importance of fluency in many areas, such as reading, athletics, music, and speaking. When I was in high school I could do a pretty good job of accurately translating French into English and vice versa, but it took me a long time and I needed to use a French/English dictionary as well as a French text book with French grammar. I could eventually get the job done and even pronounce many of the words fairly accurately, but I certainly couldn't be considered fluent in French. The same idea can be applied to other areas such as reading, writing, and arithmetic. People who are fluent commit few errors and perform competently at an effective rate for whatever it is they are doing. Fluency can be thought of as mastery of the subject matter. Some call it *automaticity*.

Precision teachers have *improved fluency* as one of their major goals and use many timing techniques to measure and record improvements in fluency. One-minute timings are commonly used to assess improved learning of, for example, addition of two-digit numbers. Jane may be given worksheets with numerous two-digit addition problems of similar difficulty. Then she is timed to see how many of the problems she can correctly answer in one minute.

Fluency is an important element that is often overlooked in educational plans. Three benefits of achieving fluency are longer retention of what was learned, increased endurance or stamina in performing the behavior, and increased ease in transferring the new skills to new situations.

STANDARD CELERATION CHART, STANDARD BEHAVIOR CHART

The results of these precision teaching timings are recorded on specialized graph paper called *standard celeration charts* or *standard behavior charts*. These charts are printed with lots of blue lines and look pretty confusing at first, but really aren't that bad.

CHARTING

Charting is what precision teachers call keeping track of the data on standard celeration charts. The precision teaching motto is "Care enough to chart."

SAFMEDS

Another precision teaching term you may hear is *SAFMEDS*. What the heck is a SAFMED, you ask? Well, SAFMEDS is an acronym, one of those words made up of the first letter of a bunch of other words for easy remembering. In this case SAFMEDS stands for "Say All Fast, Minute Each Day, Shuffled." What this basically amounts to is a teaching technique based on using flash cards to help Jane learn something, maybe the state capitals, by presenting them to her every day for a one-minute timing, but shuffling them each time so that she doesn't just memorize a sequence list.

Although this precision teaching stuff may sound pretty complicated, once the children get used to it they often have the responsibility of recording their own behaviors. There is a classic instructional slide-tape presentation from around 1970 called *Charting Rates with Stephanie Bates*, which has a kindergarten student, Stephanie Bates, explaining and demonstrating how to use the standard celeration chart for charting behavior.

PROGRAMMED INSTRUCTION

Programmed instruction is a term used to describe employing principles of learning to choose and organize the content of what is being taught (curriculum) and how it is to be taught. There are all sorts of variations to programmed instruction, but it is more commonly thought of as being used at the college level for introductory and other psychology and education courses.

PSI

PSI is not the name of a hit TV show but stands for *personalized system of instruction.* PSI was developed by Skinner's good buddy and fellow graduate student at Harvard, Fred Keller. PSI is an application of individualized instruction. It involves a progress-at-your-own-pace

component and the requirement to demonstrate mastery at various points before advancing further through the curriculum. While mechanical teaching machines and programmed texts were often used in PSI, many of the programmed texts and the mechanical teaching machines have been largely replaced by computers. In PSI, quizzes are used to determine when the student has achieved sufficient mastery to move on to the next unit, rather than to come up with a grade.

PROGRAMMED TEXT

A particularly interesting and often enjoyable form of programmed instruction that you might have already run into is *programmed texts*. Books written in programmed text format help readers to learn better what they have read. An excellent and well-known book that presents a behavioral approach to childhood problem behavior, *Living With Children* (Patterson 1976), is a good example of a book written in (1)_____text format, to help readers learn what they are reading. Programmed texts are often written in a fill-in-the-blank format with prompted answers provided nearby for quick self-monitoring and self-correction, if needed. This approach makes it easier for readers to (2)_____ what they are reading about as they go along. Reading a programmed text might not always go as quickly as reading a more typical book. Programmed texts encourage active learning by prompting behavior as the reader is guided to behave actively and overtly along the way. The reader is (3)_____ to provide answers to various questions about what is being read. By the end of the book the reader hasn't just gotten to the end of the book passively. Instead at the end we have a reader who has actively acquired more of the knowledge of the book content, and, by overtly (4)_____ by completing the sentences with the correct answer, has strengthened that learning still further. When the material is particularly difficult and when writing for younger readers, stronger discriminative stimuli are often used to occasion the correct answer. An example of this might be something along the lines of "Events that occasion behavior are called (5) d_ _c_ _ _ _ _ _ _ _ _ _ s_ _ _ _ _ _."*

Actually this section on programmed texts is written in programmed text format, and this wasn't too bad, was it?

*Answers:

1. programmed
2. learn
3. prompted
4. behaving
5. discriminative stimuli

MATCH TO SAMPLE

Match to sample is another behavioral teaching technique that is pretty much just what it sounds like. The child is shown a sample of something and a group of comparison choices to possibly match the sample. The child is directed to choose the best match for the sample, like multiple choice. In a simple example the correct match can be identical to the sample such as a green block or a yellow crayon. But in a more complex example, match to sample may be used to teach word recognition. The word "cat" might be shown on a card and Dick is shown pictures of several animals to choose from, including of course a cat. The correct choice results in immediate reinforcement.

STIMULUS EQUIVALENCE

In more complex situations the matching stimuli are not identical, but are equivalent in what they represent. Did you ever hear in math class that if A = B and B = C, then A = C? It's sort of the same idea. Suppose the symbol 🐕 represents a picture of a dog that we see in a book, D O G represents the word written out using the letters D, O, G, and "dog" represents the sound of the spoken word dog. These three stimuli are all symbols that represent the concept of dog, and should all get the idea of dog across, so they are all considered equivalent stimuli. Interestingly, in most cases when two of these relations are directly taught, such as 🐕 (pictured) = D O G (written), and 🐕 = "dog" (spoken), the individual will usually make the connection D O G (written) = "dog" (spoken) on her own. So now if Jane hears the word "dog," she could select 🐕 or the written

word D O G, and so on, even though she's never been taught this directly.

This is essentially what people mean when they talk about understanding something. *Stimulus equivalence* and its applications can get a lot more complicated, but that's beyond what we need to know for now. Teaching stimulus equivalence relationships is particularly helpful in language training. Although this is another topic for another place, you might be interested to know that stimulus equivalence can contribute to the spread of phobias and other emotional reactions as well.

If you're interested in learning more about what is happening in behavioral education these days, you might find the professional journals *Education and Treatment of Children*, published by The Roscoe Ledger, and *The Journal of Behavioral Education*, published by Springer Science and Business Media, interesting.

As I'm sure you know, the ability to communicate is critical to humans. ABA has proven to be very useful in helping people to learn to communicate more effectively. In the ABA world we refer to communication-related behaviors as verbal behavior.

LANGUAGE AND VERBAL BEHAVIOR

We briefly mentioned verbal behavior at the end of Chapter 2. Since verbal behavior is a big part of ABA and language problems are a big part of ASDs, here are a few terms you might hear when talking about verbal behavior that it might come in handy to know.

MAND

A *mand* is a request. When using verbal behavior terminology in talking about verbal behavior, mand pretty much means to ask for something. Think of de-mand and com-mand, but not necessarily so emphatically. Mands are particularly easy to teach since they directly benefit the speaker by helping speakers to more easily get what they want. If Dick wants Jane to pass him the remote control, he might just say, "Give me the remote control," which would be a mand.

TACT

Tact is another verbal behavior term that essentially means to name or label something. If Jane refers to a furry little animal with a long tail that says, "meow" as a "kittie," she has tacted the cat. If Jane is looking through a picture book and sees a picture of a cookie, points to the cookie and says, "Cookie," Jane has tacted the cookie. On the other hand when Jane is looking for a snack she might go up to her mother and say, "Cookie!" Now that's a mand. Are you still with me? Remember, given the situation and function it serves, the same bit of verbal behavior could be a mand or could be a tact, sort of like the same word could be a verb or a noun, like *step* or *phone*, depending how you use it.

ECHOIC

An *echoic* is a type of verbal behavior that is pretty much what it sounds like, Dick repeats or echoes what he heard Jane say. Echoic training is a beginning step in working with people with very limited spoken language. Prompting and shaping are frequently used to help get the vocal behavior going. This is also a form of imitation that is commonly used in language teaching. For example:

Teacher: "The French word for dog is chien. Say it after me: 'Chien.'"

Student: "Chien."

FUNCTIONAL COMMUNICATION TRAINING

When people have trouble expressing their needs they can get pretty frustrated and act up in one way or another. Sometimes this acting up or misbehaving leads to reinforcement such as attention. This often happens with individuals with severe speech and language deficits. *Functional communication training* (*FCT*) refers to teaching alternate ways of communicating so that individuals with severe language deficits can express themselves more successfully. This enables them to get their reinforcement by having their needs met without resorting to maladaptive behaviors. In these communication systems, behaviors other than spoken language function or work as language since they enable the child to communicate successfully with others.

Sign language and the Picture Exchange Communication System (PECS) are two examples of FCT.

PECS

PECS stands for the *Picture Exchange Communication System*. PECS is a program designed to teach beginning communication skills to people with serious communication disorders. PECS involves several phases of training, starting with teaching the child to exchange a picture of a reinforcer for the actual reinforcer and leading up to communicating about things in the environment. Pictures are used to represent common objects, and symbols are often used for other common words. PECS enables children who cannot yet communicate successfully through speech to express themselves successfully by using a series of pictures. Verbal prompting is not usually used during PECS lessons. PECS can be taught and used by parents.

ABLLS

ABLLS is short for the *Assessment of Basic Language and Learning Skills*. The ABLLS (and ABLLS-R, the revised edition) is a systematic behavioral assessment tool designed to help identify skill deficits in language and other important areas (e.g. several verbal behaviors, self-help skills, pre-academic skills) that children usually learn from daily experiences. Identifying these deficits can help with the development of individualized curricula for specific children.

ADOS

ADOS is the acronym for the *Autism Diagnostic Observation Schedule*. Like ABLLS and other rating tools, ADOS (and ADOS-2, the revised edition) isn't what psychologists consider to be a test, but rather it is an organized system for observing the behavior of people of just about any age, from toddlers to grown ups. Various behaviors are observed and rated on a variety of social and language activities. Based on these behavioral observations, scores that suggest the likelihood that Pervasive Development Disorder (PDD) or autism are appropriate diagnoses are calculated. While its original version is not particularly useful with teenagers and adults who have limited speech, ADOS-2 is more widely applicable.

VB-MAPP

VB-MAPP stands for the *Verbal Behavior Milestones Assessment and Placement Program*, which is a verbal behavior assessment system developed by Mark Sundberg, one of the leading experts on Skinner's verbal behavior approach, and his colleagues. The VB-MAPP is an in-depth program designed for use with individuals with autism and other language delays. The five parts to the VB-MAPP include sections to help with the assessment of the child's current verbal skills and obstacles to acquiring appropriate verbal behavior skills that the child faces, progress monitoring, a curriculum guide, and suggested goals.

MORE WAYS TO ENHANCE LEARNING

SPIRAL LEARNING

Spiral learning is a circular spiral teaching approach. We keep coming back over several topics, going into greater or additional detail each time, sort of like desensitization, and involving distributed learning. Have you noticed parts of this book have been somewhat repetitive, going back to touch on topics introduced in earlier chapters, but often adding additional details the second time around?

OVERLEARNING

Overlearning is another term we hear from time to time that isn't strictly an ABA term. Although this term has been used in different ways, overlearning generally refers to continuing to practice something even after the criteria for learning it has been met. Students who continue to review a list of the capitals of all of the countries belonging to the European Union, even after getting them all right in a practice test, a pianist who continues to practice a Mozart piece that she's been playing in concerts for years, an actor who continues to rehearse his lines for a play that's been running for weeks, a gymnast who continues to practice her medal-winning gymnastics routine are all engaging in overlearning. Someone who recites from memory a prayer first learned many years ago, in addition to receiving whatever benefits there may be for saying the prayer, is practicing overlearning.

A major hoped-for advantage of overlearning is that it can make the learned behavior more resistant to forgetting. Students who continue to study their math facts or spelling words may still be able to demonstrate this knowledge after long delays. Overlearning can also contribute to the likelihood of performing behaviors correctly in a particularly stressful situation such as taking a test or performing in front of an audience. Some people think of overlearning as a process that can lead to the fluency effect we talked about earlier.

LOVAAS

If you've heard much about ABA and autism, you may very well have heard the name *Lovaas* used to describe a treatment approach. Ole. Ivar Lovaas was one of the most influential pioneers in autism treatment research. Best known for a study of intense behavioral treatment used with very young children with autism, Lovaas published this research in the *Journal of Consulting and Clinical Psychology* in 1987. Lovaas reported that by the time they reached first grade, 47 percent of the children previously diagnosed with autism who received the intense behavioral treatment now had normal range intellectual and educational functioning. These children had become successful grade 1 students considered to be indistinguishable from their classmates. The treatment approach developed by Lovaas that has come to be known by various names, including early intensive behavioral intervention, discrete trial training (DTT), table top training, and of course the Lovaas approach, is just one of his contributions.

EARLY INTENSIVE BEHAVIORAL INTERVENTION (EIBI)

A term that we often hear when we're talking or reading about treatments for autism is *early intensive behavioral intervention* or *EIBI*. While EIBI is commonly used to refer to treatment approaches developed by Lovaas and his colleagues (such as discrete trial training), EIBI really says more about when and to what extent the treatment is provided than just exactly what that treatment is. Simply put, EIBI means pretty much what it sounds like it means. The treatment, or intervention, is begun when the child is quite young, sometimes as young as two years, and is often for 30–40 hours each week. In some cases EIBI involves a team of well-trained and supervised service providers who take turns working with the

child and the family in the child's home. The emphasis of EIBI programs is usually on developmentally appropriate behaviors such as communication, self-help and social skills that are needed to increase the child's chance of succeeding in the local public schools educational programs rather than requiring placement in highly specialized schools for the rest of his or her school career.

DISCRETE TRIAL TRAINING (DTT)

While, over the years, a lot of different things have been labeled DTT, *discrete trial training* (*DTT*) refers to certain structured, intense teaching strategies that are sometimes used to teach very specific behaviors. These approaches can be highly scripted and repetitive involving a series of repetitive trials employing the same antecedent, behavior, and consequences. For example, a teacher might sit right across a small table from the student, and prompt the student to name certain letters that they are shown over and over again. This can be a useful way to teach certain things to certain students, but can be very intense, and if not carefully monitored, risks becoming an aversive experience for some students. Also, there is usually little generalization from this approach alone, so other procedures need to be used to help generalize the performance of the newly learned behavior from the highly artificial environment to the more natural environment.

Although DTT is an important and successful instructional method, it is one of many. DTT should be thought of as a very helpful early step for many children that should eventually be followed by more mainstream teaching approaches as the students acquire the prerequisite skills needed to benefit from these other approaches. As students progress through DTT, they increasingly receive more training in the natural environment.

INCIDENTAL TEACHING

Teaching that takes advantage of opportunities that come up naturally in the natural environment is called *incidental teaching*. Incidental teaching is an important part of programs used to help with the maintenance and generalization of behaviors already at least partially learned. This might involve situations in which the child initiates an interaction with a nearby adult, perhaps asking

for help with something. Prompting Dick to make correct speech sounds when the opportunity comes up would be another example. Or there might be an informal request, such as when Jane is having trouble zipping her jacket and she goes and stands right in front of her teacher. The teacher sees Jane struggling with her zipper, so takes advantage of this naturally occurring opportunity to teach Jane how to ask for help and use the zipper.

Although incidental teaching can be planned to a point, natural reinforcers are used. When students are involved in their favorite, highly preferred activities or high-probability behaviors, teachers sometimes take advantage of these opportunities to strengthen useful new but lower probability behaviors. During free time after lunch Dick might like to look through a book of train pictures (high-probability behavior). But before giving Dick the train book, Dick's teacher prompts him to clear away his lunch leftovers (low-probability behavior) first, then immediately gives him the train book (positive reinforcement). Remember the Premack Principle?

When you think of incidental teaching, think of the old saying "Strike while the iron is hot." In one version of incidental teaching, when a learning opportunity arises Jane is required to engage in two rehearsal trials right after the initial learning episode before the reinforcer is presented. This way she actually gets three practice trials so it becomes a way to increase the amount of practice of the new behavior in the natural environment. For example, when it's appropriate for Jane to say, "Hello, Dick," she does so, then two more "Hello Dick"s are prompted before Jane receives her reinforcer.

Some behavior analysts use the term *incidental teaching* to describe a relatively simple type of Natural Environment Training.

NATURAL ENVIRONMENT TRAINING/NATURAL ENVIRONMENT TEACHING (NET)

When we are talking about things like DTT and incidental teaching we might hear the terms *Natural Environment Training* or *Natural Environment Teaching* used to describe what may sound like an alternative approach to using ABA principles. But actually Natural Environment Training (NET) emphasizes using ABA principles to teach Dick in the real world, his natural environment, rather than in the more artificial environment of sitting at a table such as in DTT. In

many applications of NET we teach according to a more predictable schedule and with more pre-planning than with incidental teaching. Intrinsically motivating materials and the child's interests are used where possible.

Instead of thinking of these approaches as either/or or opposites, it might be more useful to think of NET as part of a continuum of learning environments moving from the most structured to the least structured environment. While not everyone needs to start at the same point on this continuum, for many people a very structured, restrictive situation really is the best place to start, with the goal always being to move over time to less structured, more "normalized", increasingly natural environments. What one person calls incidental teaching and someone else thinks of as NET can overlap. As approaches on a continuum, there is no absolute, distinct end of one and beginning of another.

PIVOTAL RESPONSE TREATMENT

Pivotal Response Treatment (*PRT*), sometimes called *Pivotal Response Training* or *Pivotal Response Therapy*, is an ABA-based treatment approach developed by Lynn and Robert Koegel. Rather than focusing on numerous individual behaviors, the focus of PRT is on what are called pivotal responses or behaviors. Pivotal responses are important behaviors in areas such as self-management and social interaction skills, motivation, and the ability to respond to multiple cues that are critical to successful functioning in many important areas. The idea is that teaching certain key, pivotal behaviors can open the door to learning other related behaviors. The opportunities to learn these related behaviors can come along more naturally as the newly learned pivotal behaviors are practiced. By focusing on these pivotal areas, it is hoped the improvements will generalize to related areas more easily, without the need to work directly on target behaviors in these related areas. PRT is less structured than strict DTT, is play based, relies on natural reinforcers, and has a strong parent-training component.

POSITIVE BEHAVIOR SUPPORT (PBS), POSITIVE BEHAVIORAL INTERVENTIONS AND SUPPORTS (PBIS)

Positive Behavioral Interventions and Supports (*PBIS*, formerly known as *Positive Behavior Support*) is an approach to dealing with behavior issues in home and school settings that emphasizes positive control.

The *Positive Behavior Support* (*PBS*) movement began as a reaction to what was seen as an overuse of aversive control measures with developmentally disabled individuals. PBIS has an organization of its own, the Association for Positive Behavior Support (APBS) and holds conferences and conducts training to promote the use of PBIS in schools and other settings. PBIS employs many of the methods and procedures of ABA, and many PBIS proponents are also behavior analysts. PBIS is largely compatible with ABA.

VERBAL BEHAVIOR APPROACH

The *verbal behavior* (*VB*) *approach*, which is designed to work with children with limited speech and/or language abilities, is based on Skinner's view of verbal behavior. Much of the work on this approach has been done by Jack Michael and his colleagues. Basic to the VB approach is teaching mands (remember mands?) and then going on to work on other language needs, especially what are commonly called expressive language skills. This approach is particularly useful with children who have not yet acquired conversational language skills.

CABAS

CABAS is an acronym for *Comprehensive Application of Behavior Analysis to Schooling.* Doug Greer, of Columbia University's Teachers College, has developed a little something called CABAS which is a behaviorological systems approach that is more than just a reading program or token economy scattered here and there, but rather a system that thoroughly impacts the entire school from the ground up. Behavioral principles are applied to all members of the school community—students, teachers, supervisors, and parents—to help them learn to perform their various roles more effectively. CABAS demonstration schools, including schools that specialize in working with children with ASDs and related communication disorders, have

been established in the United States, Ireland, and England. The CABAS Board holds international conferences and offers certification for teachers and others who work in behavioral education.

In the last few chapters we've talked about some of the more common applications of behavioral principles that you are likely to encounter. There are others, of course, and depending on the particulars of the real-life circumstances and the creativity of those developing the behavioral programs, most of these procedures can be dressed up in a seemingly endless variety of ways to improve their effectiveness.

CHAPTER 9

SUMMING UP

Well, here we are, coming into the home stretch. Let's just take a few pages to go over some important guidelines to remember:

1. The reinforcement (or aversive consequence) should follow immediately after the behavior we want to modify. While it is not always practical to distribute reinforcers immediately, it is nearly always possible to administer substitutes such as tokens, stars, points, or check marks which can be redeemed later for backup reinforcers. This is especially helpful with children who are not very motivated by rewards that to them seem so far in the future that they lose their reality and their effectiveness. Giving Dick and Jane something tangible brings the future reward much closer in terms of effectiveness.

2. Some of the most common reinforcers used in schools are specific classroom jobs, going to recess early, use of toys for a specified length of time, extra time in a resource room, and individual attention from teachers. Attention is one of the most powerful of all reinforcers. After all, attention is often an S^D that more reinforcement is coming. For some children any kind of attention at all is reinforcing, even the attention that comes with a scolding by a teacher or a beating from a parent. This is one of the reasons why reprimanding disruptive behavior sometimes has no effect on certain children. Actually, because of the attention involved, it may even be reinforcing the disruptive behavior.

3. Initially, small approximations of the desired behavior should be reinforced.

4. Reinforcement should be frequent, especially at first, but should be relatively small.

5 Reinforcers can be more effective if they are obtainable only as a consequence of performing the desired behavior.

6 Reinforcers should be varied. If Jane receives too much of one thing she soon becomes tired of it and it loses its reinforcing qualities. Reinforcement menus can help with this.

7 There is no such thing as a universal reinforcer. What is reinforcing (or aversive) to Dick is not necessarily reinforcing to Jane. We have to be very careful that what we choose to use as reinforcers really are reinforcers in the situation and for the person with whom they are to be used. No matter how nice we think something is, if it doesn't increase the behavior, in that situation at least, it is not a reinforcer.

8 It is important that Jane knows why she is being reinforced or punished.

9 Presentation of a token should be accompanied by an explanation such as, "You remembered to bring your homework today, Jane, so you earned this token."

10 The source of a reinforcement is important. A compliment from someone whose favor we are trying to win is usually more powerful than the same comment from someone we don't care about.

11 Reinforcement programs should be set up so that everyone involved can easily earn some reinforcers right from the start. If failure is met at the beginning, the children might be turned off by the program before it has a chance to work.

12 Any contract negotiated must be fair, honest, and clear.

13 Occasionally the problem arises of other children being envious of Dick if they feel he is receiving special treatment. This can be overcome by allowing Dick to earn reinforcers for the entire class. He is also likely to become more popular.

14 Sometimes it is possible to identify certain stimuli or conditions that seem to be causes or are always present when the target behavior occurs. Remember *discriminative stimuli*? If this is the case, then a change in these conditions is often enough to

change the target behavior. For example, if Dick only acts up when he is sitting near a particular classmate the solution would seem to be to keep them separated in class.

The use of ABA principles and procedures in general has many advantages. Some of them are as follows:

1. ABA can be used with just about any kind of problem. Cautela and Ishaq (1996) published a book which includes many examples of the use of behavioral principles in a wide range of areas, including substance abuse, HIV (human immunodeficiency virus) prevention, college teaching, poverty, sport and exercise, and geriatrics.
2. ABA techniques are based on experimental evidence. If one technique doesn't work, it is discarded. Experimentation is encouraged, and there are all kinds of empirical evidence that show how behavior modification techniques are more effective than other approaches in treating similar kinds of problems.
3. ABA-based interventions can be more personal and less mechanistic than other approaches. Treatment procedures can be tailor made to fit individual students and their learning style and needs rather than treating every person in the same assembly-line manner, ignoring their individuality.
4. By setting objective, measurable, and observable behavioral goals, we can easily see if what we are doing is working.
5. Since everybody is modifying behavior all the time anyway, behavioral procedures can easily be applied in some form when working with children.
6. The results of behavior modification are often reversible. Whatever is learned can usually be unlearned and relearned.

You have probably recognized a lot of these principles and techniques as procedures that you already use or see used in working with children. As we talked about earlier, a great deal of behavior modification is really just a systematic and efficient use of common sense.

So now you are an informed consumer of ABA! Until you get more detailed training, however, let the professional experts do it. An introduction like this certainly can't be complete, but I hope that I've been able to explain much of the mysterious vocabulary and ideas used in the world of ABA. But if some of the explanations don't seem to make sense given what you see going on in your child's program, or if you hear other terms being used, by all means ask the "experts" who are using those terms to explain what they mean in plain English. Then you can add your own personalized appendix to the back of this book to make it more individualized and complete for your program. And if asking the experts isn't convenient, many of the books mentioned in the Appendix and listed in the References section have helpful explanations in the text and useful glossaries. Good luck, and remember to *catch them being good*!

APPENDIX

WHAT ELSE CAN I READ ABOUT ABA?

If you've read this far I hope you've found *Understanding Applied Behavior Analysis* to be a good beginning to your understanding of ABA. While I've tried to cover a lot of the basics in a way that helps build up your ABA confidence, what we've covered in these pages is only the tip of the ABA iceberg.

In the first edition I asked readers for suggestions for a possible second edition. I received several excellent ideas and tried to include as many as I reasonably could. Besides the additional terms suggested, most of the other requests boiled down to, "Give more information about how to actually do ABA," especially application details and case studies. But remembering that the original purpose of the book was to be a brief introductory reference book that wouldn't be too lengthy, I just couldn't include everything.

But if you would like more information about ABA, or even help in applying these techniques with your children, there already are a lot of very good books out there. Some of those books are fairly new while others have been around for quite a while. In some of the older books you'll find ABA referred to as behavior modification.

Although some people think it is nice to have the newest everything, the truth these days is that most schools and many people simply do not have adequate funding to pay for their basic needs, let alone all the latest books and materials for their libraries. After looking through some libraries in schools and other settings as to what is sometimes available to staff and parents in less affluent settings, I found some of the "oldies but goodies" that are among my personal favorites. While they may be sitting around in a bookcase with a little dust on them, they are still very helpful.

So until I get around to writing another ABA book with a lot of that "How to do ABA" information, what I can do is recommend some other good books that provide a lot of helpful "how to" information and may already be on a bookshelf near you. Most of these books do not require any specialized psychological training to understand them. More complete information about the authors and publishers of these works can be found in the References section.

As far as what to actually do goes, two particularly good books for parents are *Living with Children*, by Gerald Patterson (1976), and *Parents*

are Teachers, by Wesley Becker (1971). Many of the ABA principles you've been introduced to are discussed in greater depth, and ways of applying these principles to specific childhood behavior problems are suggested by the expert authors.

Glenn Latham's *The Power of Positive Parenting* (1994) would be a particularly good read for parents who might get frustrated by their children and be tempted to resort to aversive control measures. Another good book for parents is *Changing Children's Behavior,* by the husband and wife team, John and Helen Krumboltz (1972). It lists many common childhood behavior problems and offers behaviorally based suggestions on how to deal with them.

Social problems are a major issue that many children face, whether they are considered to have an ASD or not. A nice little book that deals with this issue and can be helpful to just about any adult reader is *Helping Kids Make Friends*, by Stocking, Arezzo and Leavitt (1979).

Steps to Independence (Baker *et al.* 2004) is a terrific resource for parents and other caregivers of children with special needs. It includes programs for teaching a variety of everyday skills such as self-help, toileting, and play skills. The *Steps to Independence* series grew out of the authors' work at Camp Freedom, one of the first behaviorally oriented summer camps for children with special needs, back in the 1970s. Bruce Baker, the first author of *Steps to Independence*, was one of my first behavior modification teachers, so it's got to be old. But although it's been around for over 30 years, *Steps to Independence* has been through several updates and it's still in press, so you know it's got to be good!

There are also a growing number of newer books that are worth looking at. *Functional Behavior Assessment for People with Autism* by Beth Glasberg (2005) goes into greater detail about how to apply many of the concepts you've just read about.

Mary Lynch Barbera's *The Verbal Behavior Approach: How to Teach Children with Autism and Related Disorders* (2007) is a wonderful book for parents that explains ways of using ABA to help children with communication issues and other problem behaviors at home.

The ABA Program Companion, by Tyler Fovel (2002), is an excellent resource for people developing and implementing ABA-based programs for children. It discusses basic ABA principles with an emphasis on how to actually put them to use with real children. (Whoever it was who wanted me to add more reproducible forms to my book, Tyler's book could be the book for you!)

Parents' Education as Autism Therapists, edited by Keenan, Kerr and Dillenburger (1999), is an interesting collection of articles written by parents and professionals discussing various issues related to using ABA

principles with children with autism. The authors are members of a group named Parents Education as Autism Therapists (or PEAT), established to help bring training in ABA to parents in Northern Ireland. It provides a good overview of ABA and many excellent case examples of parents using ABA treatment with their own children, under the supervision of ABA experts. A second book edited by Keenan *et al.*, *Applied Behavior Analysis and Autism* (2006), includes additional case studies and other contributions written by parents. Anthony Graziano began a three book series that includes quite a few interesting cases with *Behavior Therapy With Children* (1971). This series is also worth taking a look at.

For those of you who like your ABA information in FAQ format, there are two newer books that I can recommend. The first, *How to Think Like a Behavior Analyst* (2006) by Jon Bailey and Mary Burch, does a good job of answering many basic questions and responding effectively to common misunderstandings and criticisms of ABA. The second, *The Parent's Guide to In-Home ABA Programs*, written by Elle Olivia Johnson (2013), answers many questions frequently asked by parents of children beginning in-home ABA programs and other questions that parents probably should ask.

In addition there are a few excellent books written at the college text level that I'd like to mention. Murray Sidman's *Coercion and its Fallout* (1989) is a very thorough discussion of the pros and cons of the use of punishment and other aversive procedures. Sulzer and Mayer first published *Behavior Modification Procedures for School Personnel* back in 1972, but it is still a wonderful book that is a very thorough first text in ABA for people who may be working on the front lines with children in school settings.

Sidney Bijou's *Behavior Analysis of Child Development* (1995) is a short introductory book for students interested in child development from a behavioral point of view. It first appeared in 1961 with the most recent revision in 1995. Roland Tharpe and Ralph Wetzel's 1969 book *Behavior Modification in the Natural Environment* describes a successful consulting model they developed for delivering ABA treatment through the direct work of the "treaters" on the front lines, the parents, teachers, and other caretakers of behaviorally disordered children. This is a fairly advanced book, but might be of particular interest to behavior analysts and others involved with parent and teacher training and consultation programs.

Many of the behavioral programs used to help children include some form of token economy. Two books that you might find interesting if you are involved in setting up and managing a token economy are *The Token Economy* by Alan Kazdin (1977) and *The Token Economy* by Ted Ayllon and Nate Azrin (1968). (That's right. Both books have the same title. Seems confusing to me.) Kazdin's book is a great summary of historical background, types of token economies, and how to use and move beyond

token economy systems. For the more historically interested reader Ayllon and Azrin write in detail about what is often considered to be the first token economy system, the program they developed at Anna State Hospital in Illinois, back in the 1960s.

Well now, if you have worked your way through *Understanding Applied Behavior Analysis* and perhaps a few of these other books, you may feel that you are ready for a scholarly text. If you do, a book I would recommend is Cooper, Heron and Heward's (2007) very thorough and well-written text, simply titled *Applied Behavior Analysis*. And finally, if you are just interested in learning more about behaviorism in general, there is Skinner's 1976 classic *About Behaviorism*.

Actually, there are many books, CDs, DVD/videos, and other materials available that can be very helpful for people living or working with children and adolescents. In addition to Jessica Kingsley Publishers, there are other publishing companies that also seem to have a special interest in this area. It might be worth your while to get a copy of their catalogs or check out their websites.

As I've said, many of the books I've mentioned were first published quite a while ago. Well, the laws of learning haven't changed and since these books are still readily available after all this time, that speaks pretty well to their usefulness and popularity. Enjoy your reading, and may you be greatly reinforced when you use ABA!

REFERENCES

Ayllon, T. and Azrin, N. (1968) *The Token Economy*. Englewood Cliffs, NJ: Prentice-Hall.

Bailey, J. and Burch, M. (2006) *How to Think Like a Behavior Analyst.* New York, NY: Routledge.

Baker, B. L., Brightman, A. J., Blacher, J. B., Heifitz, L .J. *et al.* (2004) *Steps to Independence.* Baltimore, MD: Brookes Publishing.

Bandura, A. (ed.) (1974) *Psychological Modeling: Conflicting Theories*. New York, NY: Lieber-Atherton.

Barbera, M. L. (2007) *The Verbal Behavior Approach: How to Teach Children with Autism and Related Disorders.* London: Jessica Kingsley Publishers.

Becker, W. C. (1971) *Parents are Teachers*. Champaign, IL: Research Press.

Bijou, S. (1995) *Behavior Analysis of Child Development.* Reno, NV: Context Press.

Cautela, J. R. (1970) Personal communication, January 1970.

Cautela, J. R., and Groden, J. (1978) *Relaxation: A Comprehensive Manual for Adults, Children and Children with Special Needs*. Champaign, IL: Research Press.

Cautela, J. R. and Ishaq, W. (eds) (1996) *Contemporary Issues in Behavior Therapy: Improving the Human Condition.* New York, NY: Plenum Press.

Cautela, J. R. and Kearney, A. J. (1986) *The Covert Conditioning Handbook.* New York, NY: Springer.

Cautela, J. R. and Kearney, A. J. (1990) "Overview of Behavioral Treatment." In M. E. Thase, B. A. Edelstein and M. Hersen (eds) *Handbook of Outpatient Treatment of Adults*. New York, NY: Plenum Press.

Cautela, J. R., Cautela, J. and Esonis, S. (1983) *Forms for Behavior Analysis with Children.* Champaign, IL: Research Press.

Cooper, J., Heron, T. E. and Heward, W. L. (2007) *Applied Behavior Analysis* (second edition). Upper Saddle River, NJ: Prentice-Hall.

Fovel, J. T. (2002) *The ABA Program Companion.* New York, NY: DRL Books.

Glasberg, B. A. (2005) *Functional Behavior Assessment for People with Autism.* Bethesda, MD: Woodbine House.

Goldstein, A. P., Sprafkin, R. P. and Gershaw, N. J. (1976) *Skill Training for Community Living: Applying Structured Learning Therapy.* New York, NY: Pergamon.

Gray, C. and White, A. L. (eds) (2002) *My Social Stories Book*. London: Jessica Kingsley Publishers.

Graziano, A. M. (ed.) (1971) *Behavior Therapy With Children.* Chicago, IL: Aldine.

Graziano, A. M. and Kean, J. E. (1967) "Programmed relaxation and reciprocal inhibition with psychotic children." In *Proceedings*, 75th Annual Convention, pp.253–254. Washington, DC: American Psychological Association.

Groden, G. (1993) "Treatment of Inappropriate Emotional Responding to Criticism by a Young Man with Autism Using Covert Conditioning." In J. R. Cautela and A. J. Kearney (eds) *Covert Conditioning Casebook.* Pacific Grove, CA: Brooks/Cole.

Johnson, E. O. (2013) *The Parent's Guide to In-Home ABA Programs: Frequently Asked Questions About Applied Behavior Analysis for Your Child With Autism.* London: Jessica Kingsley Publishers.

Kazdin, A. (1977) *The Token Economy.* New York, NY: Plenum.

Keenan, M., Kerr, K. P. and Dillenburger, K. (eds) (1999) *Parents' Education as Autism Therapists: Applied Behavior Analysis in Context.* London: Jessica Kingsley Publishers.

Keenan, M., Henderson, M., Kerr, K. P. and Dillenburger, K. (eds) (2006) *Applied Behavior Analysis and Autism.* London: Jessica Kingsley Publishers.

Krumboltz, J. D. and Krumboltz, H. B. (1972) *Changing Children's Behavior.* Englewood Cliffs, NJ: Prentice-Hall.

Latham, G. (1994) *The Power of Positive Parenting.* North Logan, UT: P & T Ink.

Lovaas, O. I. (1987) "Behavioral treatment and normal educational and intellectual functioning in young autistic children." *Journal of Consulting and Clinical Psychology 55*, 3–9.

Nikopoulos, C. and Keenan, M. (2006) *Video Modeling and Behavior Analysis.* London: Jessica Kingsley Publishers.

Patterson, G. R. (1976) *Living with Children.* Champaign, IL: Research Press.

Reynolds, G. S. (1968) *A Primer of Operant Conditioning.* Glenview, IL: Scott Foresman.

Sidman, M. (1989) *Coercion and its Fallout.* Boston, MA: Authors Cooperative.

Skinner, B. F. (1957) *Verbal Behavior.* New York, NY: Appleton-Century-Crofts.

Skinner, B. F. (1968) *The Technology of Teaching.* New York, NY: Appleton-Century-Crofts.

Skinner, B. F. (1976) *About Behaviorism.* New York, NY: Vintage Books.

Stocking, S. H., Arezzo, D. and Leavitt, S. (1979) *Helping Kids Make Friends.* Allen, TX: Argus Communications.

Sulzer, B. and Mayer, G. R. (1972) *Behavior Modification Procedures for School Personnel.* Hinsdale, IL: Dryden Press.

Tharpe, R. G. and Wetzel, R. J. (1969) *Behavior Modification in the Natural Environment.* New York, NY: Academic Press.

The Oxford American Dictionary and Guide (1999) New York, NY: Oxford University Press.

Ullman, L. P. and Krasner, L. (eds) (1965) *Case Studies in Behavior Modification.* New York, NY: Holt, Rinehart and Winston.

Webster's New Collegiate Dictionary (1976) Springfield, MA: G.C. Merriam Co.

Wolpe, J. (1958) *Psychotherapy by Reciprocal Inhibition*. Stanford, CA: Stanford University Press.

Wolpe, J. and Wolpe, D. (1988) *Life Without Fear*. Oakland, CA: New Harbinger.

SUBJECT INDEX

99 Ways to Say Very Good (Dirksen) 112–3
A-B-A-B reversal design 94
ABA Program Companion (Fovel) 153
abolishing operation (AO) 41–3, 54
About Behaviorism (Skinner) 155
acceptance and commitment therapy (ACT) 24–5
accidental reinforcement 69
acts see behavior
aggression see labels
analysis see behavior analysis (components of)
Analysis of Verbal Behavior (journal) 35
anecdotal evidence 25
antecedents
  abolishing operation (AO) 41–3, 54
  definition 37
  establishing operation (EO) 41–3, 54
  high probability command sequence 103
  identifying 87
  motivating operation (MO) 41–3, 54
  precursors 44
  setting events 40–1
  variety in forms of 38–9
  see also stimulus
applied behavior analysis
  description of 20–1
  history of 21–2
  see also behavior analysis (components of)
Applied Behavior Analysis and Autism (Keenan, Kerr and Dillenburger) 154
Applied Behavior Analysis (Cooper, Heron and Heward) 155
assessment *see* functional behavioral assessment
Assessment of Basic Language and Learning Skills (ABLLS) 140
Association for Behavior Analysis International 21, 22, 26, 35
Association for Positive Behavior Support 146
attention 110–1
  see also joint attention
attention deficit hyperactivity disorder (ADHD) 32
Autism Diagnostic Observation Schedule (ADOS) 140
autism spectrum disorders (ASD)
  ABA effectiveness with 9
  early intensive behavioral intervention 142–3
  Lovaas approach 142
  progressive muscle relaxation and 129–30
automatic reinforcement 49–50
avoidance (negative reinforcement) 57–8, 64

backup reinforcers 51
backward chaining 104
Bandura, Albert 71
baseline, establishing 84–7
Bates, Stephanie 135
BCaBA (board certified assistant behavior analyst) 23
BCBA (board-certified behavior analyst) 23
BCBA-D (doctoral level) 23
behavior
  collateral 36
  covert 28–9, 35–6
  dead man rule 28–9
  definitions 27–8
  external 28, 29
  maladaptive 35
  objective 27, 81–2
  see also target behavior; verbal behavior
Behavior Analysis of Child Development (Bijou) 154
behavior analysis (components of)
  adjusting the program 95–6
  finding the baseline 84–7
  functional analysis 78–9
  functional behavioral assessment 79–80

behavior analysis (components of) *cont.*
identifying antecedents 87
identifying aversive stimuli 90
identifying consequences 89–90
identifying positive reinforcers 90–3
location of target behavior 87–8
noting time of target behavior 88–9
operationalizing target behavior 81–4
presentation of data 87, 89
program evaluation 95–6
program monitoring 93–5
program planning 93
recording systems 86
ten steps overview 96
Behavior Analyst Certification Board (BACB) 23
behavior analyst (definition) 23
behavior modification 33–4
Behavior Modification in the Natural Environment (Tharpe and Wetzel) 154
Behavior Modification Procedures for School Personnel (Sulzer and Mayer) 154
behavior therapist (definition) 23–4
behavior therapy (definition) 23–4
Behavior Therapy With Children (Graziano) 154
behavioral contract 119
behavioral contrast 61
behavioral drift 101–3
behavioral education
Assessment of Basic Language and Learning Skills (ABLLS) 140
Autism Diagnostic Observation Schedule (ADOS) 140
Comprehensive Application of Behavior Analysis to Schooling (CABAS) 146–7
definition 131
direct instruction 131
discrete trial training 143
DISTAR program 132
early intensive behavioral intervention 142–3
Education and Treatment of Children (journal) 138
errorless learning 132–3
functional communication training 139–40
incidental teaching 143–5
Journal of Behavioral Education 138
Language for Learning program 132
Lovaas approach 142
match to sample 137
natural environment training 144
overlearning 141–2
Picture Exchange Communication System (PECS) 140
Pivotal Response Treatment 145
Positive Behavioral Interventions and Supports 146
precision teaching 133–5
programmed instruction 135–7
spiral learning 141
stimulus equivalence 137–8
verbal behavior 138–47
Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) 141
verbal behavior (VB) approach 146
behavioral momentum 103–4
behavioral objectives 83–4
behavioral repertoire 72–3
behaviorologists 26
behaviorology 26
bribery 121

Case Studies in Behavior Modification (Ullman and Krasner) 22
chaining 104–6, 127
Changing Children's Behavior (Krumboltz and Krumboltz) 153
charting 135
Charting Rates with Stephanie Bates 135
Children's Reinforcement Survey Schedules 91
class of behavior 30
classical conditioning 73–4
classroom strategies 114–25
clinical behavior analysis (CBA) 24–5
clinical behavior analyst 24
Coercion and its Fallout (Sidman) 60, 154
cognitive behavior therapist 24
cognitive behavior therapy (CBT) 24
collateral behavior 36
communication *see* verbal behavior
compliments 111–3
Comprehensive Application of Behavior Analysis to Schooling (CABAS) 146–7
conditioned motivating operations (CMO) 43
conditioned reinforcer 48

conditioning *see* classical conditioning; covert conditioning; operant conditioning
consequences 46, 89–90
contingency contract 119
contingency of reinforcement 21–2, 74
continuous reinforcement 65
contracts, contingency 119
contrived reinforcement 51–2
correction 123–4
covert behavior 28–9, 35–6
covert conditioning 75
Crimmins, Daniel 90

data presentation 87, 89
demand fading 123
dialectical behavior therapy (DBT) 24–5
differential reinforcement 113–7
  of alternative behavior 115–6
  of high rates of behavior 117
  of incompatible behavior 115
  of low rates of behavior 117
  of other behavior 114–5
direct instruction 131
Dirksen, Arzella 113
discrete trial training 143
discriminative stimuli 37–9, 39–40
DISTAR program 132
distributed practice 125
drift, behavioral 101–3
Durand, Mark 90
duration of behavior 86

early intensive behavioral intervention 142–3
echoic (verbal behavior) 139
edibles 51
education *see* behavioral education; classroom strategies
Education and Treatment of Children (journal) 138
elicited behavior 44
emitted behavior 44–5
Engelmann, Siegfried 132
environment
  definition 31
  natural 31–2
  prosthetic 32, 33
  social 31–2
  therapeutic 33
errorless learning 132–3
escape (negative reinforcement) 57, 64

establishing operation (EO) 41–3, 54
ethics 60–1
event sampling 85–6
evidence-based practice (EBP) 25
external behavior 28, 29
extinction 58, 64
extinction burst 58–9
extrinsic reinforcers 49

fading 106–7, 123
feelings 29
fines 121
fixed interval schedule 66, 68, 114
fixed ratio schedule 65–6, 67
fluency 134
Forms for Behavior Analysis with Children (Cautela, Cautela and Esonis) 91
frequency of behavior 29–30, 85–6
functional analysis 78–9
Functional Behavior Assessment for People with Autism (Glasberg) 153
functional behavioral assessment 79–80
functional communication training 139–40
Funnix 132

general level of reinforcement (GLR) 92
generalization 108–9
generalized reinforcers 50
Greer, Doug 146
Groden Center 75

habituation 53–4
Helping Kids Make Friends (Stocking, Arezzo and Leavitt) 153
Horizon 132
How to Think Like a Behavior Analyst (Bailey and Burch) 154

imitative learning *see* modeling
incidental reinforcement 69
incidental teaching 143–5
Individualized Educational Plan (IEP) 95
information-gathering 80
integrity checking 94–5
intermittent reinforcement 65–8
International Society for Behaviorology 26
intrinsic reinforcers 49

joint attention 111
Journal of Applied Behavior Analysis 21, 22
Journal of Behavioral Education 138
Juniper Gardens Children's Project 22

Keller, Fred 135
Koegel, Lynn 145
Koegel, Robert 145

labels 27–8, 81–2
see also objective acts
language *see* verbal behavior
Language for Learning program 132
latency 87
"law of effect" 47
learning, definitions 30–1
limited hold 117
Lindsley, Ogden 28, 133
Living with Children (Patterson) 136, 152
location of target behavior 87–8
Lovaas approach 142

maintenance of behavior 108
maladaptive behavior 35
mand (verbal behavior) 138
massed practice 125
match to sample 137
measuring behavior *see* behavior analysis (components of)
medication 31
Michael, Jack 146
Midwest Association for Behavior Analysis 21
modeling 71–2, 72–3, 127
momentum, behavioral 103–4
motivating operation (MO) 41–3, 54
Motivational Assessment Scale (MAS) 90
multiple baseline approach 94

natural environment 31–2
natural environment training 144
natural reinforcers 51
negative practice 124
negative reinforcement 54–8, 64
noncontingent reinforcement 118

objective acts 27, 81–2
observational learning *see* modeling
operant conditioning 46–7
overcorrection 124
overlearning 141–2

pairing 48–9
Parents are Teachers (Becker) 153
Parents' Education as Autism Therapists (Keenan, Kerr and Dillenburger) 153
Parents Education as Autism Therapists (PEAT) 154
Parent's Guide to In-Home ABA Programs (Johnson) 154
partial reinforcement 65–8
Pavlov, Ivan 73
personalized system of instruction 135–6
phobias 74
photo chaining 127
Picture Exchange Communication System (PECS) 140
Pivotal Response Treatment 145
Positive Behavioral Interventions and Supports 146
positive practice 124
positive reinforcement 47–8, 64, 90–3
Power of Positive Parenting, The (Latham) 153
practical application *see* behavior analysis (components of)
practice *see* distributed practice; evidence-based practice (EBP); massed practice; negative practice; positive practice
precision teaching 133–5
precursors 44
Premack Principle 91
primary reinforcer 48
Primer of Operant Conditioning, A (Reynolds) 46
probe testing 94
program evaluation 95–6
program monitoring 93–5
program planning 93
programmed instruction 135–7
programmed text 136
progressive muscle relaxation 129–30
prompt dependence 107
prompt fading 106–7
prompt hierarchy 107–8
prompts 39–40, 107–8
prosthetic environment 32, 33
psychological behaviors 28–9
punishment 60–3, 64

radical behavior therapy 24
radical behaviorism 29
rate of behavior 30
RBT (registered behavior technician) 23
reading 35
Reading Mastery 132
reading (suggested) 152–5
recording systems 86

rehearsal, behavioral 127–8
reinforcement
  accidental/incidental 69
  automatic 49–50
  avoidance (negative reinforcement) 57–8, 64
  backup reinforcers 51
  conditioned reinforcer 48
  contingency of 21–2, 74
  contrived 51–2
  differential 113–7
  edibles 51
  effective reinforcers 42–3
  escape (negative reinforcement) 57, 64
  extrinsic reinforcers 49
  general level of 92
  generalized reinforcers 50
  intrinsic reinforcers 49
  motivation and 41
  natural reinforcers 51
  negative 54–8, 64
  noncontingent 118
  pairing 48–9
  positive 47–8, 64, 90–3
  primary reinforcer 48
  sampling 92
  secondary reinforcer 48
  social 50, 92–3
  superstitious behavior 69–70
  see also reinforcement schedule
reinforcement area 120–1
reinforcement menu 120
reinforcement schedule
  continuous reinforcement 65
  fixed interval 66, 68, 114
  fixed ratio schedule 65–6, 67
  intermittent reinforcement 65–8
  partial reinforcement 65–8
  thinning 67
  variable interval 66–7, 68, 114
  variable ratio schedule 66, 67–8
Reinforcement Survey Schedule 90–1
Relaxation: A Comprehensive Manual for Adults, Children and Children with Special Needs (Cautela and Groden) 129
relaxation training 129–30
relevance of behavior rule 83
replacement behavior 82–3
response 34
response class 30
response cost 63, 64, 121–2
response differentiation 100
response generalization 109
response strength 103
reverse chaining 104
rule-governed behavior 74–5

"SAFMEDS" 135
satiation 52–3
scatter plots 88–9
school *see* behavioral education; classroom strategies
scripting 128
secondary reinforcer 48
setting events 40–1
shaping 98–100
sign language 35, 140
simplicity, importance of 98
Skinner, B. F. 21, 22, 29, 35
social environment 31–2
social learning *see* modeling
social reinforcement 50, 92–3
social skills
  behavioral rehearsal 127–8
  guided practice 128–9
  photo chaining 127
  relaxation training 129–30
  scripting 128
  Social Stories 127
  training of (overview) 125–6
  transfer training 109, 128
  video modeling 127
Social Stories 127
soft reprimands 110
spiral learning 141
spontaneous recovery 60
standard behavior chart 134–5
standard celeration chart 134–5
Steps to Independence (Baker *et al.*) 153
stimulus
  definition 37
  discriminative 37–9, 39–40
  prompts 39–40, 107–8
  see also antecedents
stimulus control 40
stimulus equivalence 137–8
stimulus overselectivity 111–3
Structured Learning Therapy 126
Sundberg, Mark 141
superstitious behavior 69–70
symptom substitution 59
systematic desensitization 24

tact (verbal behavior) 139
target behavior 34
terminology 10, 21–2, 133
therapeutic environment 33
thinning 67
Thorndike, E. L. 47
time out 122–3
time sampling 86
timing of target behavior 88–9
token economy 119–20
Token Economy, The (Ayllon and Azrin) 154–5
Token Economy, The (Kazdin) 154–5
topography 30
transfer training 109, 128
trial 34–5
"trial and error" 48
triggers 44

unconditioned motivating operations (UMO) 43

Vargas, Julie 133
variable interval schedule 66–7, 68, 114
variable ratio schedule 66, 67–8
verbal behavior
  behavioral education and 138–47
  collateral 36
  definitions 35
Verbal Behavior Approach: How to Teach Children with Autism and Related Disorders (Barbera) 153
Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) 141
Verbal Behavior (Skinner) 35
verbal behavior (VB) approach 146
verbal compliments 111–3
vicarious learning see modeling
video modeling 127
Video Modeling and Behavior Analysis 127

Wolf, Montrose 22
writing 35

AUTHOR INDEX

Arezzo, D. 153
Ayllon, T. 83, 154
Azrin, N. 83, 154

Bailey, J. 154
Baker, B. L. 153
Bandura, A. 71
Barbera, M. L. 153
Becker, W. C. 153
Bijou, S. 154
Burch, M. 154

Cautela, J. 91
Cautela, J. R. 33, 81, 91, 129, 150
Cooper, J. 155

Dillenburger, K. 153

Esonis, S. 91

Fovel, J. T. 153

Gershaw, N. J. 126
Glasberg, B. A. 153
Goldstein, A. P. 126
Gray, C. 127
Graziano, A. M. 129, 154
Groden, G. 75
Groden, J. 129

Heron, T. E. 155
Heward, W. L. 155

Ishaq, W. 150

Johnson, E. O. 154

Kazdin, A. 154
Kean, J. E. 129
Kearney, A. J. 81
Keenan, M. 127, 153, 154
Kerr, K. P. 153
Krasner, L. 22
Krumboltz, H. B. 153
Krumboltz, J. D. 153

Latham, G. 153
Leavitt, S. 153
Lovaas, O. I. 142

Mayer, G. R. 38, 154

Nikopoulos, C. 127

Oxford American Dictionary and Guide 121

Patterson, G. R. 136, 152

Reynolds, G. S. 46, 47

Sidman, M. 60, 154
Skinner, B. F. 21, 35, 155
Sprafkin, R. P. 126
Stocking, S. H. 153
Sulzer, B. 38, 154

Tharpe, R. G. 154

Ullman, L. P. 22

Webster's New Collegiate Dictionary 27
Wetzel, R. J. 154
White, A. L. 127
Wolpe, D. 74
Wolpe, J. 24, 74